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with the respects of the
Author.

HARMONY

OF

ANCIENT HISTORY,

AND

CHRONOLOGY

OF THE

EGYPTIANS AND JEWS.

BY

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INTRODUCTION.

Ancient chronology is to some extent a speculative subject. The causes of this are the incomplete and conflicting chronologics which have been handed down from the ancients, and the efforts of modern scholars to bring order out of confusion, and to supply what is wanting to perfect a system which will give to the reigns of kings and dynasties their proper epochs in a well-known year like the Julian.

The compilation of Manetho, the authority for Egyptian chronology, was made during the reign of Ptolemy Philadelphus. That he had access to original and authentic information is borne out by the results of recent monumental discovery, but this kind of confirmation does not extend to the whole of his chronology. There appears to have been an effort upon the part of the early chronologers to form a comparative system. It was to place the chronologies of the Jews, Egyptians, Assyrians, Babylonians, Persians, and Greeks in harmonious relations to each other. The original work of Manetho is lost; we only possess it in the form of copies, and these differ materially. The Manethonian numbers have been altered. This was done by more than one hand, and more than one object was in view. The copies profess to identify the reigns in which certain Grecian chronological epochs had their origin, and as chronologers differed as to these epochs, and as these differences were not allowed to affect the Egyptian reigns in which these epochs began, the list of Manetho had to be so changed that in one copy, following one system, the same king had an entirely different epoch from that which he had in another copy, adjusted to another system. Another disturbing element was the misunderstanding of Jewish chronology. Modern chronological experiments cannot be productive of real harm, even if they are not of much good, but this cannot be said of the work of the early chronologers.

Modern monumental discovery has brought to light many facts bearing upon the chronology of Egypt. Chronological lists have been found engraved upon the walls of temples, and many inscriptions discovered and translated, which, while confirming Manetho in some particulars, have discredited him in others. These have encouraged great departures from the chronology in vogue up to the time the influence of modern discovery began to make itself felt.

Scholars have gone outside of merely chronological details, and striven to fix the epochs of certain kings by means of astronomical phenomena, which are recorded upon the monuments in connection with a year in some king's reign. All these influences are at work, controlling to a more or less extent every effort made to form a system for the Egyptians, and the results are diverse and conflicting. Dr. Brugsch calls attention to the conclusions reached by the modern school of German Egyptologers. Among them there is a difference of two thousand and seventy-nine years as to the era of Mena, the first king. The disparity is the same, he points out, as if a dispute should arise sixty centuries after our time concerning the date of the reign of the Roman Emperor Augustus, some placing his epoch B.C. 207, and others A.D. 1872. A perfect chronology should furnish accurate details of the lengths of reigns, a complete series of successive reigns, and an epoch from which to reckon, chronologically, the years, so as to place the history in relation to the present time. All these are wanting to Egyptian chronology. The possible error as to the epoch of the Persian invasion of Egypt is small, and this will affect perhaps only one historical synchronism, and the plain course for the chronologer to follow is to arrange the chronology so as to produce the synchronism. Owing to monumental discovery, our knowledge of the Egyptian dynasty, which came to an end with the Persian invasion, is chronologically more complete than that of any other. Above this there is no certainty of the reigns of most of the kings, or the length of the several dynasties. But the case is not so bad as it would at first sight appear. We certainly can do without particular and accurate knowledge of every chronological circumstance, provided here and there in the history the reigns of certain kings can be fixed by independent facts. This

is one of the objects of this work, which I have endeavored to carry out by the identification of the epochs of astronomical phenomena, the dates of which are recorded upon monuments erected by certain kings. If astronomical phenomena are recorded in the terms of the vague year (the traditional and historical year of the Egyptians), and if the correct concurrence between the Julian and the vague year is discovered, as the periodic times of such phenomena are known to modern astronomical science, tables furnishing their recurrent dates may be made for both the Julian and the vague year. The phenomena for which dates are found are those of the moon, eclipses, heliacal risings of stars, and the cardinal points of the tropical year. The recurrent times of these phenomena are different. The case is such that, if an inscription should mention the occurrence of one of these upon a certain date of the vague year, modern science, by means of the concurrent dates of the Julian and the vague year, can determine in what years such an event was possible. The record of two different phenomena upon the same date in one inscription, and the recurrence of one or both of them on the same date in another, or other inscriptions of a manifestly different age, or upon another date which of itself denotes a different time, makes it possible to establish the correct epochs of the dates of the inscriptions. The historical periods are not too great or remote to invalidate conclusions reached in this way. By such means I have endeavored to establish the epochs of the reigns of Thutmes III., Rameses II., and to confirm the epoch of Takelath II.

Incidental to this subject, the technical chronology of the Egyptians is discussed. Two facts are brought out,—that a wrong adjustment between the Julian and the vague year has prevailed for many centuries, and that the present status of the Julian is seven days in error. The Julian year of chronology is adjusted to have the new moon following the winter solstice on the 1st of January, B.C. 45. The original Julian, using the dates of the chronological Julian, began on the 25th of December, B.C. 46. It is not in use at the present time, being superseded by the chronological Julian.

Following the subject of Egyptian chronology, that of the Jews is considered. The chronological year of the Jews is found

to have been the vague year, which is used in the forms of years of twelve months and years of ten months. The chronology, considered by itself, is determined by its own internal evidence. It forms a complete whole, and when to any one of the reigns an epoch is given, those of all the others naturally follow from it. The integrity of the chronology is independent of these epochs, but it is of the first importance by their means to place it in its true position to the present time. Unfortunately, the dates of astronomical phenomena are not so readily got at as in the case of Egyptian inscriptions. The evidence of these at the outset is principally inferential, but the same kind of argument is followed. The difficulties are many and complex. I can but briefly outline them here. In the first place, the data furnished by the Bible must be arranged and construed so as to conform to the facts related. This is not so easy a matter, because it cannot be done unless several kinds of years were in use and the apparently conflicting data made to undergo a transformation which will reproduce the historical synchronisms which are on record. The adoption of the vague for the historical year has to be made upon the internal evidence of the chronology; we have not the same independent authority for it as for the Egyptian year. This is true of both the year of twelve months and the year of ten months, for the latter, by cycles of sixty months, which are equal to six years of ten months and five years of twelve months, runs side by side with the year of twelve months, but enumerates one more year in that time. After the chronology is arranged to be consistent with itself, epochs are to be given to its years. Two things are necessary to be known to accomplish this: first, if any, what astronomical phenomena may be reasonably looked for at certain epochs; second, the reproduction of recorded synchronisms between the events of Jewish history and the independent chronologies of other nations. The astronomical canon, or the canon of Ptolemy, furnishes a list of Babylonian and Persian kings with their chronological epochs. The canon has been long held to be of the highest authority, because, it is said, the epochs of certain kings, and the whole list by means of the year of the era of Nabonassar, are astronomically fixed by the eclipses which are recorded as having been observed on certain dates of the Egyp-

tian vague year, giving in the same connection the year of the era and the regnal year of some king. The Jewish epochs are found from the canon by giving to the fourth year of Jehoiakim the same epoch as the first year of Nebuchadnezzar, on the authority of the Bible, which declares these regnal years to have synchronized. But as it will be shown that the adjustment between the Egyptian vague year and the Julian, followed by the canon as interpreted by the Almagest to identify the recorded eclipses, is incorrect, and consequently no eclipses were on the recorded dates in those years, the astronomical basis of the canon is swept away. The lowering of the canon, which I advocate, is prompted by the epochs which I have given to the Jewish chronology independently of it, and the changes made are not arbitrary,—that is, made simply for the purpose,—but they have some sort of historical testimony in their favor. The whole scheme rests largely on circumstantial evidence, which is stronger than any direct testimony which is self-contradictory, and which can only be overcome by superior circumstances, if any such can be found. It is claimed for the Jewish scheme that there is not one single chronological statement in the Bible from which it does not remove all improbability, even if some subordinate matters are left in doubt. This is an advance upon the chronology usually followed. All conflicts between it and the chronologies of other nations are removed, which cannot be done by the old system. Even if the reduction of the era of Nabonassar be disallowed by a wiser criticism than that followed in this work, still the Jewish chronology will stand. It will only be necessary to increase all its epochs eighteen years, and to cause some of the astronomical conditions prevailing at the era of the Tabernacle to be dominant at the epoch of the exodus. I have placed the epoch of the exodus in B.C. 1397, and the era of the Tabernacle in the following year,—B.C. 1396. If the epoch of the exodus should be raised to B.C. 1415, which is nineteen years earlier than B.C. 1396, the lunar dates in respect to the tropical year will be about the same in B.C. 1415 as in B.C. 1396. Since I have acted upon the assumption that the political epoch of the nation was in B.C. 1397, and the technical epoch in B.C. 1396, the change of the epoch of the exodus to B.C. 1415 will cause the technical and the political epochs to coincide, and

Abib is to have the same lunar dates in B.C. 1415 as in B.C. 1396, and also to have the vernal equinox upon the 1st of that month.

In the brief outline here given the reader may obtain some idea of the scope of this work. Much of the success of the Egyptian portion, if competent criticism shall decide in its favor, is due to the admirable and faithful history of Egypt under the Pharaohs by Dr. Brugsch. As my work is dependent upon the accuracy of the translator of Egyptian inscriptions, it is of the first importance that they should be rendered in their purity, and not transformed to suit the mistaken but honest views of the historian. Laying every other argument aside, the results are alone sufficient to prove the truthfulness of the facts upon which they are founded. Commenting upon Theon, who in his formula for the rising of the Dog-star calculates from the era of Menophres, Dr. Sharpe writes: "And Theon calls the beginning of the great Egyptian cycle of fourteen hundred and sixty years, which began in the year B.C. 1321, the era of Menophres, and thus seems to fix the year in which either his reign began or he reformed the calendar." One point of agreement between myself and Dr. Sharpe is the rise of Sirius on the 1st of Thoth in the reign of Thutmes III., who is Menophres. Latterly, the more favored plan has been to place this event in the reign of Rameses II.; that is, the heliacal rising of B.C. 1321 or 1322, by some found to have been in the reign of Thutmes III., is by others given to the reign of Rameses II., thus causing a difference of about two hundred and eighty years in the epochs of these kings. My method of obtaining the epochs of Thutmes III.'s reign is entirely independent of the rise of Sirius or any calculation by the sidereal year. More than this, the *sole reign* of Thutmes III., which began in B.C. 1318, as determined by the chronology of this work, had for its era the rise of Sirius on the day of the full moon, on the 1st of Thoth. Another rising of Sirius is found for the reign of Rameses II., which is confirmed by an inscription clearly indicating such an event, even to the year and day of the month, the chronology in this case also being independent of such a fact, but furnishing the means by which it is discovered.

Concerning the Jewish portion, it may be said I have found my way by a path not often trodden, but which was never

obliterated. Drawn by the use which Niebuhr had made of the Romulian year, or year of ten months, to solve some of the problems of Roman history, I am led to apply the same kind of year to Jewish chronology. One or two trial tests were sufficient to encourage the effort which has produced the results which are set before the reader. Nothing in this has helped me more than a determination to adhere strictly to the Bible account, and to adopt that scheme which required no sacrifice of any historical statement, whether biblical or otherwise. Any other course would leave the chronology to a certain extent doubtful. Little good can be got by the advocacy of one set of historical facts to the exclusion of others when the critical test by which the last is done is some chronological scheme with which they disagree. Doubt is thrown upon the whole subject if there is a conflict of testimony. With the canon of Ptolemy, the truth of which has been attacked, it is different. Real history, and not chronological tables compiled or emended long after the events to which they apply, is meant. One of the chief arguments against the canon is its disagreement with other histories. The line of my criticism is not in the direction of condemning the canon in its original state, but rather to show that if the statements of Ptolemy in the Almagest were ever true, they are not so now. Evidently the canon has undergone some change to render plausible the particular astronomical basis which is claimed for it. The alterations proposed are those which permit of a similar astronomical foundation. Here I have gone further, and indicated the astronomic chronological system to which they belong. It is tentative in character. Substantially the same end may be obtained by other changes, but none appeared so satisfactory as those adopted. Better and complete results, it is hoped, may be reached through future monumental discovery. Of one thing we may be confident,—they will agree with the discoveries already made. On this account, it is believed, they will add to, and not detract from, the truth of the conclusions here reached. Knowledge of the chronology of the past, freed from the large element of conjecture which has hitherto prevailed in all opinions, is particularly the demand of the age. In certain quarters there is a tendency to treat with scorn the so-called demands of the age. The failure of crude

theories and rash experiments which were in defiance of the settled experience of mankind has encouraged this attitude. But what I mean by the demand of the age has been the demand of every age, which is, simply, truth. Until quite recently the historical portions of the Old Testament have had no rival worthy of the name in their particular domain, but monumental discovery has produced other witnesses of the past, who speak not by hearsay, but as participants in the events of which they relate. My purpose has been to show that these agree with the history as told in the Old Testament or Hebrew Bible.

PART I.

EGYPTIAN CHRONOLOGY.

CHAPTER I.

TECHNICAL CHRONOLOGY OF THE EGYPTIANS.

The Egyptian vague year contained three hundred and sixty-five days, which were divided into twelve months, all of thirty days, with five intercalary days added in between every two years. If it is said the Egyptian year, although of three hundred and sixty-five days, was technically only of three hundred and sixty days, the distinction is not trifling, nor is the subject necessarily confused by the statement. It is not meant that the intercalary days formed no part of the three hundred and sixty-five, but that a time-measure, called a year, was of three hundred and sixty days; it fell short of the period to be measured, to which is also applied the term year, five days (not counting a portion of a day), and this number of days are leaped over by the year of three hundred and sixty days, so the next year of this kind may commence on a three hundred and sixty-sixth day. Chronology has a philosophical as well as a practical side. Time, as an appreciable part of eternity, is preceded and followed by durations which form no part of it. The future becomes a part of time only as portions of it lose that character and become present, and the past only as it has in this manner been at some recognized period a present is it a part of time. Time is preceded and followed by unformed durations,—that is, periods, the measurements of which have not been experiential. An expression for eternity is time preceded and followed by intercalary periods of infinite durations. The distinction between a duration which is experiential and one which is not does not apply to time which is always experimental, but the distinction between the intercalary days and the year has something analogous to it. The case of the Roman soldiers in the time of Augustus, who were required to serve three hundred and sixty-five days and only received pay for three hundred and sixty days, is to this point. The myth of the five intercalary days, which were festivals in the Egyptian year, is based upon the doctrine that

these days belonged to neither month nor year. The Sothic cycle consisted of fourteen hundred and sixty-one vague years, and as this many equal fourteen hundred and sixty Julian years, the fourteen hundred and sixty-first year was regarded by the later Egyptians as intercalary and belonging to God. The only part of duration which belongs to man is time; eternity belongs to God. Attention is called to this character of the intercalary days, because some writers have advanced the view that the year of three hundred and sixty days and that of three hundred and sixty-five were as time-measures of different values, holding the years of three hundred and sixty days were the ones used for the purpose of records and reigns of kings. This notion appears to have caused certain alterations in Eusebius's and Africanus's copies of the list of Manetho. These writers in their copies agree as to the king reigning at the time of the Trojan war. Another list, called the Old Chronicle, has many points of resemblance to those of Africanus and Eusebius. The following table shows the dynasties of the third book of Manetho,—that is, from the twentieth to the thirty-first dynasties, inclusive. It exhibits only the totals of years of each. The figures in brackets to the right of certain dynastic totals are what the regal years correctly add, there being in some instances a difference between the sum set as a total and the correct addition.

Old Chronicle.			Africanus.		Eusebius.	
Dynasty.	No. Kings.	Years.	No. Kings.	Years.	No. Kings.	Years.
20	8	228	12	135	12	172
21	6	121	7	130 [114]	7	130
22	3	48	9	120 [116]	3	44 [49]
23	2	19	4	28 [89 or 92]	3	44
24	3	44	1	6	1	6
25	3	44	3	40	3	44
26	7	177	9	150.6 mo. [106.6 mo.]	9	167 [171]
27	5	124	8	124.4 mo.	8	120.4 mo.
28	. .	. .	1	6	1	6
29	. .	57 { 39	4	67.4 mo. { 20.4 mo.	5	57.4 mo. { 21.4 mo.
30	1	57 { 18	3	67.4 mo. { 38	3	57.4 mo. { 20
31	. .	. .	3	67.4 mo. { 9	3	57.4 mo. { 16
	38	862	64	807.2 mo.	58	790.8 mo.

The Old Chronicle omits the thirty-first dynasty, but its last two reign fifty-seven years, and the last three of Eusebius reign fifty-seven years and four months. As the Old Chronicle omits all portions of years, it apparently ends its list at the same time as that of Eusebius. All these lists end at B.C. 332, the date of the conquest of Egypt by Alexander the Great.

EPOCH OF THE CAPTURE OF TROY.

Africanus and Eusebius place the capture of Troy in the reign of Thuoris, the last king of the nineteenth dynasty. According to both of these copyists his reign was short, only lasting seven years. It cannot be far wrong to assume that its close and the capture of Troy had the same epoch. By the Old Chronicle we obtain eight hundred and sixty-two years as intervening between the close of the nineteenth dynasty and B.C. 332, which will give 1194 as the epoch. The epoch of the capture of Troy, according to Clement of Alexandria, was B.C. 1193. The epoch of 1183 for the capture of Troy, which is the one commonly adopted, may be obtained for the Old Chronicle in the following way: The eight hundred and sixty-two years, if of three hundred and sixty days, which is a year ascribed by some writers to the Egyptians, when reduced to years of three hundred and sixty-five days will lose eleven years in the count, and the epoch previously obtained becomes 1183 B.C.

Africanus gives for this period eight hundred and seven years and two months, but by the correct additions these are decreased sixty-four years, and increased sixty-one or sixty-four years. By various combinations of these discrepant numbers quite a number of possible totals in addition may be obtained. One of these is formed by increasing eight hundred and seven years by the difference between twenty-eight and ninety-two years, two of the totals of the twenty-third dynasty. This will increase the period sixty-four years, and by taking the correct additions of the twenty-first and twenty-second dynasties, instead of those set down, the period will be decreased twenty years, or the whole amount to be added is (64 — 20) forty-four years, which, we may notice, is the difference between the amount given to the twenty-sixth dynasty, one hundred and fifty years and six months, and the correct addition, one hundred and six years and six months.

This one hundred and six years and six months is caused by the omission of forty-four years, which by both Eusebius and the monuments belonged to King Amosis, who is put down in Africanus's list as a king, but with the years of his reign omitted. The total of eight hundred and seven years, if increased forty-four years, will amount to eight hundred and fifty-one years, which gives for the epoch of the twentieth dynasty, B.C. 1183, the epoch of the capture of Troy according to Eratosthenes.

The epoch of the capture of Troy for Eusebius may be B.C. 1127, the Trojan epoch given by Kallimachus. The 794+ years between the capture of Troy and B.C. 332 to produce this last epoch are obtained in the following way. The twenty-seventh dynasty of Eusebius, which is that of the Persians, is put down as of one hundred and twenty years and four months. The Old Chronicle and Africanus give this dynasty one hundred and twenty-four years. Eusebius has included four years in the previous dynasty (twenty-sixth), but has omitted them in the addition, the total being put at one hundred and sixty-seven years, the correct addition one hundred and seventy-one years. This increases the total to 794+ years. It will be found upon a scrutiny of these numbers, which we have obtained for the interval between B.C. 332 and the fall of Troy, that they generally stand to each other as 360 to 365. That is, the eight hundred and sixty-two years of the Old Chronicle, if of three hundred and sixty days to the year, equal the eight hundred and fifty-one years we have obtained for Africanus, if the last are of three hundred and sixty-five days to the year. Again, if the total obtained for Eusebius of 794+ years are of three hundred and sixty-five days, and if they are increased in number to be represented by years of three hundred and sixty days, that number is 805+ years, which is only two years less than the total 807+ years of Africanus before it is increased forty-four years. The Egyptians had not a year of three hundred and sixty days independent of one of three hundred and sixty-five days, unless it can be shown that at one time in their history they used one like the Babylonian, in which case, by the cycle of six years, it was substantially like that of three hundred and sixty-five days.

The principles relating to the intercalary days are further discussed in connection with the Jewish system.

The Egyptian months were twelve, named as follows: First, Thoth; second, Phaophi; third, Athyr; fourth, Khoiakh; fifth, Tybi; sixth, Mechir; seventh, Phamenoth; eighth, Pharmuthi; ninth, Pachons; tenth, Payni; eleventh, Epiphi; twelfth, Mesori.

The year was divided into three seasons. According to the nomenclature of Dr. Brugsch, the first season was *Sa*, the commencement or inundation; the second was *Per*, winter or seed-time; the third, *Sen*, summer or harvest. Thoth is the first month of the first season, *Sa*, or inundation. The Egyptian year being vague, none of its months will keep their places in the seasons, but fall back from them at the rate of about seven days in twenty-nine years. Since the three seasons do not exactly fit the natural conditions of the year in Egypt, it is impossible by them alone to determine the exact time when the 1st of Thoth occupies its normal place at the beginning of the first season. If the new and full moon following the summer solstice, or the rise of Sirius on one of these lunar dates, entered as an element, it could be done.

In connection with the year of three hundred and sixty-five days the Egyptians employed several cycles. Three of these are respectively called the Sothic, the Henti, and the Hib-set, which was called by the Greeks Triakonteris. Before discussing these, it is necessary to correctly adjust the Egyptian year to the Julian. We need the corresponding dates of these two years, not only to explain these cycles, but also for the right understanding of certain monumental inscriptions of great historical importance.

CHAPTER II.

THE ADJUSTMENT OF THE EGYPTIAN YEAR TO THE JULIAN.

The Julian year as applied to events prior to the reformation of the Roman year is simply a year by convention for the purposes of chronology; it had no existence previous to the year B.C. 45. It is none the less of great usefulness, for all dates are readily reducible to its terms, and thereby conveyed in a precise form and one enabling us to obtain some intelligent notion of the time of the events with which they are connected. In adopting the Julian year for this purpose, I in no way assent to the historical correctness of that year as now understood. Whether Julius Cæsar commenced the year with the 1st of January about at the winter solstice, or with the 1st of January seven days later, are questions which do not interfere with its present use, providing its character is known, which is that of a year of three hundred and sixty-five days, with an intercalary day every fifth year (that is, one in every four years), beginning with a bissextile year B.C. 45, and with the 1st of January on the day of the new moon following the winter solstice.

The common mode of reckoning by the vulgar era of the birth of Christ is followed. This makes the year B.C. 1 to be a bissextile year. According to the Julian, any year after Christ which is divisible by four without a remainder is a leap-year, and any year before Christ which when divided by four gives *one* as remainder is of the same character.

The vague year was still observed in Egypt at the time of the reformation of the Roman year by Julius Cæsar. If its dates in the Julian at that time or later are on record, and the histories of the two years being known, it would seem to be an easy matter to arrange a series of the two, with corresponding dates, which will extend many centuries backward. And so it would be were the two histories of these years accurately known.

This does not seem to have been the case, as the reader may judge later on in the discussion. In comparing the two years, I begin with a date in the Egyptian year of an astronomical phenomenon for which a corresponding date in the Julian has been calculated.

Timocharis, the astronomer, "has left an observation of the place of Venus on the seventeenth day of the month Mesori, in the thirteenth year of this reign, which by the modern tables of the planets is known to have been on the eighth day of October, B.C. 272."* This was in the reign of Ptolemy Philadelphus. Evidence will be given further on to prove that up to this time the vague year had remained unchanged.

There are two inscriptions which throw some light upon the condition of the Egyptian year between B.C. 238 and B.C. 196. The decree of Canopus† is dated "In the year IX., 7th of the month Apellæus, the 17th of Tybi." It informs us this was "on the day of the rising of the Divine Sothis which is called the New Year in his name." . . . "At present it occurs in his ninth year in the first day of Payni." . . . "But as the case will occur, that the rise of Sothis advances to another day every four years, the day of the celebration of this feast shall not pass along, but it shall be celebrated on the first day of Payni, and the feast shall be celebrated as in the ninth year;" . . . "therefore it shall be that the year of three hundred and sixty days, and the five days added to them," . . . "so one day, a feast of the benevolent gods, be from this day after every four years added to the five epagomenæ before the New Year." This was in the ninth year of Ptolemy Eucrgetes, and the inscription further informs that this was also done in order to keep the seasons to the same places in the year they then held. Calculating from B.C. 272, when the 17th of Mesori fell on the 8th of October, it is found that the 1st of Thoth fell on the 19th of October in the year B.C. 238, and the 1st of Payni the same year was on the 16th of July. Now, it is known that this ordinance, if it were ever observed, it was only for a short time. That it was carried into effect, and a day every four years added

* "History of Egypt" (Samuel Sharpe), chap. viii. (39).

† "Records of the Past," vol. viii.

to the vague for a while, must be admitted if any significance is to be given to the language of the priests, and any credit to their right to regulate such matters. The presumption is they continued to add a day every four years until they satisfied themselves that it was unnecessary to continue the practice. It appears that they had two objects in view: one, that Sirius (Sothis) should continue to rise heliacally on the 1st of Payni; the other, that the seasons should thereby be made fixed in the year, and not left to advance as they always will in the vague. Considering these separately, the following facts concerning the sidereal year may be noticed.

The gain of the sidereal year over the vague for forty years is ten days, and six hours *plus*. Now, if for forty years one day had been added every four years, then at the end of the term ten such days would be intercalated, and the difference of six hours *plus* in the rising of the "Divine Sothis" is marked enough to be clearly distinguished. This is the mean annual difference between the Julian and the vague year which the priests desired to overcome. This could have satisfied them that in one hundred and sixty years the sidereal would advance one day in a year like the Julian, and that instead of keeping the 1st of Payni to the rising of Sirius, it would fall behind at that rate, and consequently lead to the abandonment of the practice. Forty years is a period belonging to the sidereal and the vague years. It is one-fourth of one hundred and sixty years, in which time the sidereal advances forty-one days *plus*, a period only twenty-eight minutes and forty seconds longer than full days. The forty stand to one hundred and sixty as one year to four: to every four years one day is added, so to every four periods of forty one day also is added, making forty-one in all; and, if the vague year is left unintercalated, this marks the advance of the sidereal in that year.

The other reason for adding this intercalary day was to prevent the seasons from wandering through the vague year. Perhaps more importance was attached to this than to the rising of Sirius. This portion of the decree is as follows: "But that these feast-days shall be celebrated in definite seasons for them to keep forever, and after the plan of the heaven established on

this day, and that the case shall not occur, that all the Egyptian festivals, now celebrated in winter, shall not be celebrated some time or other in summer, on account of the precession of the rising of the Divine Sothis by one day in the course of four years; and other festivals celebrated in the summer, in this country, shall not be celebrated in winter, as has occasionally occurred in past times; therefore it shall be that the year of three hundred and sixty days, and the five days added to their end, so one day as a feast of Benevolent Gods be from this after every four years added to the five epagomenæ before the New Year, whereby all men shall learn that what was a little defective in the order as regards the seasons of the year." We have seen that the addition of a day every four years failed to keep the "Divine Sothis" to the 1st of Payni, the Canopic year at the end of forty years being six hours *plus* behind the sidereal. In a like manner they discovered the seasons were not keeping their places in the year, but were falling back in the new year even faster than the sidereal year was advancing. The proper number of vague years for an intercalation of ten days to produce tropical, or years of the seasons, is forty-two. These are longer than forty-two vague years by ten days, four hours *plus*. The ten intercalary days fall within a period of forty-two vague years,—that is, between B.C. 238 and B.C. 196.

The other inscription alluded to is that of the Rosetta stone. The preface to the English rendition of the French translation by M. Letronne ("Records of the Past," vol. iv.) places its date in B.C. 198, or forty years after the decree of Canopus. This is a mistake. The ninth year of Ptolemy Epiphanes, to which the dates of the Rosetta stone refer, began in B.C. 197, with 1st of Thoth concurrent with October 8. In no case could the ninth year of this king have fallen in B.C. 198, unless we alter all our opinions concerning the reigns of the kings in Ptolemy's Canon. These have been known as those containing full years, but if they do not, then as between B.C. 238 and B.C. 196 the reigns of Euergetes and Philopator came to an end, and if they are not given in full years, the first year of the successor of each of these kings overlaps each of their last years, thus reducing the period two years. In this case the ninth year of Epiphanes will fall in B.C. 198. But the years in Ptolemy's Canon are all

full years; that is, these overlappings are already allowed, and the list may not be reduced in the manner above described.

The inscription of the Rosetta stone, so far as it concerns our purpose, is as follows: It is dated "the 4th of the month Xandikos, and the 18th of the month of the Egyptians, Mechir." It recites, "Since the 30th of Mesori, when the king's birthday is celebrated, as also the 17th of Mechir, when he received the crown from his father, (the Priests) have recognized them as eponymous in the temples;" . . . "that they should be celebrated in honor of him by a panegyry in the temples of Egypt, monthly that they should celebrate a feast and panegyry" . . . "yearly in all the Temples of the country, from 1st of Thoth, during five days." While there may be some uncertainty as to the length of time the decree of Canopus was enforced, there is none of the fact that the vague year again became the Egyptian year, and I propose to show that at the time of the inscription of the Rosetta stone it was in force. The first hypothesis is that ten days were added to the vague between B.C. 238 and B.C. 196. The second hypothesis is that after they abandoned the Canopic year they re-established the vague year by increasing the dates ten days; that is, the 1st of Thoth became the 11th of Thoth, etc. Whether the number was ten or even less than ten, it does not affect the proposition that the date 18th of Mechir of the Rosetta stone was a date of the regular vague year, and that its concurrence with the Julian will be the same as if there had been no extra days added to the vague year; and, calculating from the concurrence in B.C. 272, when from the observation of the planet Venus by Timocharis we know the 17th of Mesori fell on the 8th of October, the concurrence of the 18th of Mechir in B.C. 196 is found to be March 24.

The dates 30th of Mesori and 17th of Mechir are without corresponding dates of Macedonian months. The date 18th of Mechir, concurring with the 4th of Xandikos, belongs to the ninth year of Epiphanes, which by the principle of the Canon began in B.C. 197 with the 1st of Thoth, concurrent with October 8. The decree of Canopus and the Rosetta stone put us in possession of two sets of double dates. The decree of Canopus declares that in the ninth year of Euergetes the 17th of Tybi concurred with the 7th of Apellæus. The ninth year of Euergetes

began in B.C. 239, and came to an end in October, B.C. 238. The date 17th of Tybi is in B.C. 238, and concurs with March 4. The Rosetta stone recites that in the ninth year of Epiphanes the 18th of Mechir concurred with the 4th of Xandikos. I place this in B.C. 196, when the 18th of Mechir concurred with March 24.

Since the Macedonian months were lunar, and the comparison is between them and the regular vague year, the lunar dates for the vague years B.C. 238 and B.C. 196 may be calculated, and they should agree with those of the Macedonian months. With the 17th of Tybi, concurring with the 7th of Apellæus, B.C. 238, the 1st of Dius of the Macedonian year fell on the 11th of Khoiakh, which concurred with the 27th of January. In this year the conjunction of the sun and moon was on the 3d of February; consequently the 1st of Dius was at the third quarter of the moon, and what was true of Dius was also true of the first of all the other Macedonian months. This is peculiar, because usually the old lunar months began with the visible new moon. But upon consideration it will be seen how perfectly this is adapted to the conditions of the Egyptian year. The Egyptian day began at midnight, and lunar cycles using Egyptian days should also begin at midnight, and the moon when at her third quarter rises at midnight. As the Macedonian months in B.C. 238 began with the moon at her third quarter, they were adapted to the vague year in this way, and we may conclude that they were connected with a lunar year like that belonging to the Apis cycle. As the priests had resolved to change their year to one like the Julian, they must necessarily abandon the lunar cycle adapted to the vague year, and take up with one suitable for their new year. This will be some kind of luni-solar cycle; and as the changes were made to keep the seasons and festivals relatively to the same dates, this luni-solar cycle must, like others observed for a like purpose, commence with the moon in reference to one of the four points of the sun's place in the ecliptic. In B.C. 237 the visible new moon was on the 25th of January, concurrent with the 9th of Khoiakh. This was the new moon following the winter solstice, and it complies with the conditions suitable for the beginning of a luni-solar cycle. If they at this time advanced the 1st of Dius from its place at the third quarter

of the moon to the day of the visible new moon in order to observe a cycle of this kind, the 1st of Dius, beginning it now at sunset, will concur with the 25th and 26th of January and the 9th and 10th of Khoiakh. The form of the luni-solar cycle will be similar in construction to the Sothic cycle; that is, it will contain thirty-three lunar years of twelve months, which will be intercalated at the end with a lunar year of twelve months. This cycle will begin in B.C. 237. The second will commence in B.C. 204 on the 12th and 13th of Khoiakh. The ground for this is that four hundred and eight lunar months are three days, eleven hours *plus* longer than thirty-three vague years. These dates are further affected by being those of the visible new moon. The calculation is made with regard to the vague year, because I propose to bring the cycle down to B.C. 196 at a time when the vague dates were restored, when the condition was the same as if there had been no change in the Egyptian year. The following will be the dates of the 1st of Dius in the vague year for nine years of the second cycle.

B.C.	Year of Cycle.		
204	1	1st of Dius	= 12th–13th Khoiakh.
203	2	"	= 1st–2d Khoiakh. (8–9 January.)
203	3	"	= 21st–22d Athyr. (29–30 December.)
202	4	"	= 10th–11th Athyr.
201	5	"	= 30th Phaophi–1st Athyr.
200	6	"	= 19th–20th Phaophi.
199	7	"	= 8th–9th Phaophi.
198	8	"	= 28th–29th Thoth.
197	9	"	= 17th–18th Thoth.

The ninth lunar year will begin in B.C. 197 on the 17th–18th of Thoth, concurrent with the 24th–25th of October. This year must not be confused with the ninth regnal year of Epiphanes current at this time, which by the canon was a vague year. With the 1st of Dius, concurrent with the 17th–18th of Thoth, in B.C. 197 the 4th of Xanthicus will in B.C. 196 concur with the 18th–19th of Mechir, in perfect agreement with the Rosetta stone. The 1st of Xanthicus will concur with the 15th–16th of Mechir, and was the day of the visible new moon. It is impossible

for the vague year, as the lunar dates fall back for each year at the rate of ten days, fifteen hours *plus*, to have any lunar date on the 15th of Mechir suitable for the use of lunar months which are always reckoned from the phases of the moon, in any other year but B.C. 196, for some years before and after that year. This certainly was the case in B.C. 198. I now propose to compare these results with the Apis cycle.

The Apis cycle, it is well known, contained nine thousand one hundred and twenty-five days, which is a period longer than three hundred and nine synodical months by one hour, nine minutes, and seventeen seconds. If a series of these cycles starts from an era, the lunar dates will fall back in the cycle at the rate of one hour, nine minutes, and seventeen seconds. If the series of cycles is to be continued with the same lunar dates, which is one purpose of the cycle, a new beginning must be made; a new era established, which will have the same lunar dates the preceding series had at its beginning. Six hundred vague years contain one day, three hours, seven minutes, and seventeen seconds more time than seven thousand four hundred and sixteen synodical months, and one hundred and thirty-two synodical months contain one day, three hours, fifty minutes, and twenty-nine seconds more time than eleven vague years. After six hundred and eleven years the lunar dates will be very nearly the same in the vague year as they were at the beginning of this period. Six hundred and eleven vague years contain twenty-four cycles of twenty-five years, and eleven supplemental years. The cycles after beginning regularly every twenty-sixth year, counting from the first year of the previous cycle, for twenty-four times, will, after the completion of the twenty-fourth cycle, pass over a period of eleven vague years, when another series will commence; or, to state it another way, the twenty-fourth cycle is extended to thirty-six years.

Each cycle of twenty-five years is begun with the 1st of Thoth. The cycle may be begun with any month, but Thoth is preferred because it is the first month of the vague year. The cycle also begins with the conjunction of the sun and moon on the 1st of Thoth. It could begin with full moon on that date, in which case the epoch of the first year of Cycle I. will be seven years higher.

Epoch of Series	I. (611 years)	B.C.	1661.
" " "	II. (")	"	1050.
" " "	III. (")	"	440.

These epochs are separated by six hundred and eleven vague years. The epoch of Series III. is one year higher than would be the case if the interval was in Julian years. During the series which began in B.C. 440 the Egyptian year underwent a change, and its effect upon the vague year has already been discussed, but its influence upon the Apis cycle is now to be discovered. If the vague year which began in B.C. 236 and came to an end in B.C. 235, which was the third year of a series of four years beginning in B.C. 238, received the first additional day ordained by the decree of Canopus, it would be a proper year, because Sirius rose on the 1st of Payni, B.C. 238. Let the time of the heliacal rising be put exactly at 6 A.M. on the 1st of Payni; this was not the case, but to simplify the matter we will suppose it to be at 6 A.M. The sidereal year advances in the vague six hours *plus* for each year. The condition for the four years of the series will be as follows:

B.C.	Year.	Sirius rises on 1st of Payni.
238	1	6 A.M.
237	2	12 noon.
236	3	6 P.M.
235	4	12 midnight.
234	5	6 A.M.

If to year 3, which came to an end in B.C. 236, an additional day was added, the rising of the star will be thrown back to midnight of the 30th of Pachons for year 4, and year 5 will begin a new series of four years, with the star rising at 6 A.M. on the 1st of Payni.

Of course, the same will be true if in place of 6 A.M. is inserted the true time of the rising in B.C. 238, the true advance in four years being one day, thirty-six minutes *plus*. I have supposed the Egyptian year which began in B.C. 197 to have had the vague dates restored in order to produce the concurrent dates Mechir 18 and Xanthicus 4 in B.C. 196. The year which began in B.C. 236 ceased to be vague when it received the extra day at its end in B.C. 235. The year B.C. 197, by the restoration of the vague dates, is for that reason the first vague year following

the vague year of B.C. 237; it takes the place of the vague year of B.C. 236–235.

B.C.	Year.	B.C.	Year.
240	0–1	201	0–1
239	1–2	200	1–2
238	2–3	199	2–3
237	3–4	198	3–4
236	4–5	197	4–5
235	5	196	5

In this table the cycle has been extended back from B.C. 197 to B.C. 201. It was supposed that the Apis cycle was not observed in B.C. 201, but it may be taken to be the epoch of the first year of a new series, the fifth year of which began in B.C. 197.

The condition of the new series is that the 1st of Thoth coeurs in B.C. 201 with the 9th of October, the same concurrence that existed in B.C. 1661, these epochs being exactly separated by fourteen hundred and sixty Julian years, or fourteen hundred and sixty-one vague years (a Sothic cycle). Calculating by mean months from an epoch, the following lunar dates are found:

B.C. 1661, 1st of Thoth. Conjunction of Sun and Moon, Oct. 9, 10h. 8m. P.M.
" 1050, " " " " May 10, 10h. 12m. P.M.
" 440, " " " " Dec. 8, 10h. 35m. P.M.
" 201, " " " " Oct. 8, 7h. 11m. A.M.

The difference between the new series is, the 1st of Thoth of Cycle I. (new series) is the day of the visible new moon, and not that of the conjunction of the sun and moon. The following is a table of these cycles as just described:

Table I. of Apis Cycles.

B.C. 1661	B.C. 1561	B.C. 1461	B.C. 1361	B.C. 1261	B.C. 1161	B.C. 1061
" 1636	" 1536	" 1436	" 1336	" 1236	" 1136	(1061
" 1611	" 1511	" 1411	" 1311	" 1211	" 1111	11
" 1586	" 1486	" 1386	" 1286	" 1186	" 1086	1050)

Series II.

B.C. 1050	B.C. 950	B.C. 850	B.C. 750	B.C. 650	B.C. 550	B.C. 450
" 1025	" 925	" 825	" 725	" 625	" 526	(451
" 1000	" 900	" 800	" 700	" 600	" 501	11
" 975	" 875	" 775	" 675	" 575	" 476	440)

Series III.

B.C. 400	B.C. 340	B.C. 240
" 415	" 315	
" 390	" 290	
" 365	" 265	

New Series.

B.C. 201	B.C. 101	B.C. 1	A.D. 100
" 176	" 76	A.D. 25	" 125
" 151	" 51	" 50	" 150
" 126	" 26	" 75	" 175

The purpose so far has been to show that the adjustment made upon the testimony of Timocharis in B.C. 272 was still applicable to the Egyptian year B.C. 196, subject to the advance of the Julian year in the vague. Between this point and the reformation of the Egyptian year by the Emperor Augustus no change was made in the vague year.

The following table of Apis cycles differs from the previous one in that they are reckoned from the 1st of Phamenoth, the seventh month,—that is, six months earlier,—to carry out the idea that the lunar cycle of the vague year began with the third quarter of the moon on the 1st of Phamenoth.

Table II. of Epochs of Apis Cycles.

B.C. 1661. 1st of Phamenoth concurrent with April 7. The new moon on the 15th of April concurrent with Phamenoth 9.

B.C. 1661	B.C. 1561	B.C. 1461	B.C. 1361	B.C. 1262	B.C. 1162	B.C. 1062
" 1636	" 1536	" 1436	" 1336	" 1237	" 1137	(1062
" 1611	" 1511	" 1411	" 1311	" 1212	" 1112	11
" 1586	" 1486	" 1386	" 1286	" 1187	" 1087	1051)

B.C. 1051. 1st of Phamenoth equals 6th of November. The new moon on the 14th of November equals 9th of Phamenoth.

B.C. 1051	B.C. 951	B.C. 851	B.C. 751	B.C. 651	B.C. 551	B.C. 451
" 1026	" 926	" 826	" 726	" 626	" 526	(451
" 1001	" 901	" 801	" 701	" 601	" 501	11
" 976	" 876	" 776	" 676	" 576	" 476	440)

B.C. 440. 1st of Phamenoth equals 12th of May. The new moon on the 20th of May equals 9th of Phamenoth.

B.C. 201. 1st of Phamenoth equals 7th of April. The new moon on the 13th of April equals 7th of Phamenoth.

B.C. 440	B.C. 340	B.C. 240	B.C. 201	B.C. 101	B.C. 1	A.D. 100
" 415	" 315		" 176	" 76	A.D. 25	" 125
" 390	" 290		" 151	" 51	" 50	" 150
" 365	" 265		" 126	" 26	" 75	" 175

Julius Cæsar began the reformed Roman year with the 1st of January, B.C. 45. The corresponding date in the Egyptian year is of some chronological importance. The Canon of Ptolemy, or the astronomical canon, as it is sometimes called, reckoned its years from the 1st of the month Thoth. It begins with the era of Nabonassar, and is composed of four sets of kings, or rulers of four nations,—the Babylonian, the Persian, the Egypto-Greek (the Ptolemies), and the Roman. It is of importance to know the concurrent dates of the Julian and the vague year at the time of the adoption of the former by the Romans. The existing arrangement between the two years causes the 1st of Thoth to fall on September 3, B.C. 45. This date, September 3, is connected with the date July 20; that is, this adjustment makes the vague 1st of Thoth fall on July 20 from A.D. 136 to A.D. 140. The vague 1st of Thoth must not be confounded with the legal 1st of Thoth. The former is the year which lost its legal existence when the Romans reformed the Egyptian year and made it substantially the same as the Julian by the addition of a day every four years. The 1st of Thoth, concurring with July 20, A.D. 136 to A.D. 140, is the vague, not the legal, 1st of Thoth. For it appears that the astronomers continued the use of the vague year in their calculations. The date July 20 refers to the heliacal rising of Sirius.

It is necessary, if it is possible to be done, that the history of the Roman and Egyptian years and their concurrent dates should be presented in a light consistent with the historical facts connected with them. Chronologists have endeavored to do this. I cannot do better than to quote what Dean Prideaux has written for this purpose, as the extract will contain the main facts of the history of the two years from B.C. 45 to A.D. 8.

"As Octavianus came to Alexandria in the beginning of August, so he had there settled all the affairs of Egypt by the end of it; and in the beginning of September again marched

thence, to return by the way of Syria, Lesser Asia, and Greece, again unto Rome. From this conquest of Egypt began the era of Actiac victory, by which the Egyptians afterwards computed their time till the first year of the Emperor Dioclesian, A.D. 284; from that, what was before called the era of the Actiac victory was afterwards called the era of Dioclesian, and by the Christians of those parts the era of the martyrs, because in the reign of that emperor began the tenth persecution, in which a very great number of Christians suffered martyrdom for their holy religion. Although this era had its name from the Actiac victory, yet it had not its beginning till near a full year after it,—that is, from the time that Egypt was reduced; for the day from whence it commenced was the 29th of August. And therefore, that was ever after the first day of the year, through all the years by which these eras—that is, the era of the Dioclesian, or the martyrs, as well as that of the Actiac victory—did calculate the times through which they were used. The reason which fixed the beginning of this era, and of all the years in it, to the 29th of August was, say some, because on that day Cleopatra died; and the Macedonian empire in that country thereby ending, the Roman began; but this is only a modern conjecture, for none of the ancients say it. All that we can learn from them is that she died about the end of that month, but none of them tell us on what day it happened. The true reason of fixing it at this day was because this was then the first day of their month Thoth, which was always the New-Year's day of the Egyptians, from whence they began all their annual calculations; and therefore it was thought the properest time from whence to begin all the alterations in their era, and their year, which the Romans, on the conquest of their country, made in both; and that especially since the time of that conquest fell in therewith. For at that time the form of their years, as well as the era by which they calculated them, was changed by the order of the conqueror. The old era, which was till now in use among them, was the Philippic, which commenced from the death of Alexander, and the beginning of the reign of Philippus Aridæus, his successor; and the form of their year was the same with the Nabonassaræan, made use of by the Chaldeans, which consisted of twelve months of thirty days each, and five

additional days subjoined to them; that is, it consisted in the whole of three hundred and sixty-five days, without a leap-year, the want whereof made this year to be a movable year, which after every four years began a day sooner than it did in the four years immediately preceding; so that, in the space of one thousand four hundred and sixty years, this form carried back the beginning of the year through all the different seasons of summer, spring, winter, and autumn, till it brought it about again to the same point of time, with the loss of one whole year in the cycle. For the remedying hereof, the Romans, on their subduing this country, made a leap-year in the Egyptian calendar in the like manner as in the Julian, by adding, at the end of every fourth year, one day more than had been in the other three. For, whereas the other three had only five days superadded at the end of each of them, the leap-year had six; that is, it consisted of twelve months of thirty days each, and six additional days subjoined to them; whereas all the other years that were not leap-years had the same number of like months, and only five of those days added after them. And hereby the Egyptian year was made to consist exactly in the same number of days as the Julian, though not exactly in the same form.

"For, in all other particulars, the old form of the Egyptian year was retained, after this reformation, in the same manner as before. And the 1st of Thoth, which was always the first day of the Egyptian year, falling on the 29th of August, and about the same time when the Romans, on their conquest of Egypt, ordered this reformation, this induced them that they fixed the beginning of the new year where they found the beginning of the old; and the 29th of August ever after continued to be the first day of the Egyptian year, as long as the empire of the Romans continued in that country, and from thence also—that is, from the 29th of August of this year—the new Egyptian era of the Actiac victory, as well as their new reformed year, for the same reason, had its commencement. But against this it is objected that in this year the 1st of Thoth did not fall on the 29th of August, but on the 31st of that month, and therefore this cannot be the reason why the beginning of the Egyptian era of the Actiac victory, or the beginning of the year thenceforth used in that country, was fixed to that day. And it must thus far be

acknowledged that, according to the exact calculation of the time, this objection is true. For, according to that, the 1st of Thoth fell this year in the Roman calendar on the 31st, and not on the 29th of August; but the Romans then used the form of the Julian year erroneously, whereby it came to pass that the same day which was the 31st of August in their true calendar was the 29th in their erroneous calendar, which error proceeded from hence, that, after the death of Julius Cæsar, the pontifices at Rome (as hath been above mentioned), mistaking the time of the intercalation, made every third year to be the leap-year, instead of every fourth; by which error six hours were added every third year more than should be, which in the sixteen years that intervened from the first use of that form to this year, amounting to a day and a quarter, this erroneous addition had then protruded the 29th of August in the erroneous calendar into the place of the 31st of August in the true calendar, and according to this erroneous calendar the Romans then computed, and so continued to do for thirty-six years after the first forming of this year by Julius Cæsar, till at length Augustus, on the discovery of this error, took care that, by making no leap-year for twelve years together, all the time that was erroneously added was again left out, whereby the protruded days in the erroneous calendar were all brought back again to their proper places, where they ought to have been according to the true calendar. But the protrusion of the day making no alteration in its number or name, hence it came to be said that it was the 29th of August, whereas, truly, it was the 31st of that month, from whence this Egyptian era of the Actiac victory, and all the years by which it computed, had their beginning. This era truly had its beginning from the conquest of Egypt, and therefore ought to have been called the era of the Alexandrian victory, whereby that country was reduced under the Roman yoke. But the Egyptians, to avoid the disgrace of thus owning this conquest, rather chose to call it the era of the Actiac victory, though that was gained one whole year before; and since this era was only used in Egypt, they had there it in their full power to call it by what name they pleased."*

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* Prideaux's "Connection," An. 30.

Dean Prideaux has utterly failed to explain the corresponding dates between the Julian and the Egyptian year at this time. He, in accounting for the 1st of Thoth falling on the 29th of August, B.C. 30, erred in the method of his calculation. He calculated the intercalations as at six hours every year. The intercalations he well knew were added only one day at a time, yet he says the error of the erroneous intercalations in sixteen years was one day and a quarter, and this was the reason August 29 occupied the place of August 31. The correct reason was that, as the period is sixteen years, and the first year B.C. 45 was intercalated, and every third year thereafter, the sixteenth year being one of these, six days had been added in this way against the four days required by the correct intercalations, and thereby August 29 had been advanced two days to the place of August 31. But his most unfortunate mistake is the explanation of the corresponding dates of the 1st of Thoth and the 29th of August. If, at the time of the subjugation of Egypt, Augustus reformed the Egyptian year and established its beginning to be the 1st of Thoth, corresponding to the 29th of August, what explanation is to be given of the correspondence between the two for the next twenty years, and also after the three intercalary days, which were left out of the twelve years, were omitted? For if the 1st of Thoth was at the 29th of August, B.C. 30, and also the Egyptian year at that time began to receive an intercalary day every four years, while the Roman was receiving one every three years, then in the twenty years following B.C. 30 the erroneous intercalations of the Roman year will exceed the correct ones of the Egyptian year by one day, and at the end when they ceased the 1st of Thoth will have fallen back one day to August 28. From this place, by the omission of the next three intercalary days from the Roman year, the 1st of Thoth will advance to the 31st of August, its correct place, according to Prideaux, at B.C. 30. Following the explanation given by Prideaux, it was absolutely impossible for the 1st of Thoth to fall on August 29 after the erroneous intercalations had been corrected. It was an actual fact, and not an assumed one, that the 1st of Thoth fell on the 29th of August during the Roman dominion.

If we were tied down to a particular of this view by any historical fact, such as, that in the year B.C. 30, Augustus reformed

the Egyptian year, it would be set down as a blunder on his part if he had expected to accomplish the result he aimed at by the method which Dean Prideaux describes. But there is no such historical fact. Other writers place the reformation of the Egyptian year in B.C. 24, connecting that event with the twentieth year of Augustus, when, according to what would have been the correct intercalation of the Julian, the 1st of Thoth would fall on the 29th of August. These reckon Augustus's first year from B.C. 43. This view, while it retains the era of Actium, begins that era with a correspondence between the Roman and the Egyptian year which ought to have come about some six years later, but which did not because of the irregular intercalations. Again, the Augustan era, which by some is held to be the same as that of Actium, is by others made to begin in B.C. 27, as the year in which he first received the name of Augustus. This will give for the twentieth year of the emperor B.C. 9, which was the last year incorrectly intercalated. Augustus, like Julius Cæsar, did not attempt to reform the Roman year until he became Pontifex Maximus, the supervision of the calendar belonging to his office as chief priest. It is reasonable to suppose the reformation of the Egyptian year took place at about the same time. Augustus became Pontifex Maximus, according to chronologers, in B.C. 14 or B.C. 13. The usual chronology requires the 1st of Thoth to be on the 3d of September, B.C. 45. It is upon this adjustment of the vague year to the Julian that Dean Prideaux and other chronologers base their explanations of the legal date of the 1st of Thoth in the Julian year. Not one of these accounts for the historical facts connected with the two years, because it is impossible to do so on the basis that in B.C. 45 the 1st of Thoth corresponded with September 3. I propose to do this by making the concurrent dates of B.C. 45 the 1st of Thoth and the 7th of September. To obtain this arrangement I begin the Julian year on the 25th of December of B.C. 46, and bring down to this point the adjustment of the Julian and vague year produced by the observation of Timocharis in B.C. 272.

In B.C. 272, as already explained, the 17th of Mesori fell on the 8th of October. This will cause the 1st of Thoth in this year to equal the 27th of October. But if the beginning of the

1st of January, B.C. 45, is put back seven days to December 25, the correspondence in B.C. 272 must, as to the date of Julian, be put forward seven days to November 3. The precession of the Julian in the vague from B.C. 272 to any date in the vague year corresponding to a date in the Julian following the 1st of March, B.C. 45, is fifty-seven days, which will throw back the 1st of Thoth that many days, so that in this year its corresponding date will be September 7. I have already gone over the first step in this argument,—that is, the effect the observation of Timocharis has upon the concurrent dates of the Julian and the Egyptian years. It now remains to discover if there are any grounds for this correction of the beginning of the Julian year by putting it back seven days, and then to apply the effect of the new arrangement to the concurrent dates under consideration.

The article "Calendar (Roman)" in Smith's "Greek and Roman Antiquities" contains the following: "It was probably the original intention of Cæsar to commence the year with the shortest day. The winter solstice at Rome, in the year B.C. 46, occurred on the 24th of December of the Julian calendar. His motive for delaying the commencement for seven days longer, instead of taking the following day, was probably the desire to gratify the superstition of the Romans, by causing the first year of the reformed calendar to fall on the day of the new moon. Accordingly, it is found that the mean new moon occurred at Rome on the 1st of January, B.C. 45, at 6h. 16′ P.M. In this way alone can be explained the phrase used by Macrobius, '*Annum civilem Cæsar, habitis ad lunam dimensionibus constitutum, edicto palam proposito publicavit.*' This edict is also mentioned by Plutarch where he gives the anecdote of Cicero, who, on being told by some one that the constellation Lyra would rise the next morning, observed, 'Yes, no doubt, in obedience to the edict.'" Macrobius does not say that the 1st of January began on the day of the new moon, but he means that the epoch of the year established by Julius Cæsar began adjusted to the moon. This is not necessarily the new moon. The Roman civil day began at midnight. In beginning the epoch adjusted to the moon, the civil day should begin with the moon in some relation to its beginning. The Jews, for instance, as will be more fully

set forth in the second part of this work, began their epoch and day with the full moon,—that is, at sunset. In the case of the Romans, as the moon is to be visible to have any clearly-marked relation to midnight, the beginning of the civil day, it should be either rising or setting or on the meridian at that time. Now, if it is known by a calculation that the new moon was a little after six o'clock P.M. on the 1st of January, it follows that on December 25 the moon was at her third quarter and rose at midnight, the beginning of the civil day. We have here just what Macrobius describes, and which is wanting if the epoch began with the new moon, at 6h. 16′ P.M. on the 1st of January. In ordinary dates it is sufficient for the moon to fall at any time in the same day, but an era should have the astronomical phenomena—which are possible under the system of time-measurement employed—at the beginning. As to the beginning on the day of the new moon to gratify the superstitious notions of the Romans, if this was not done, then the prevalence of such a superstition may perhaps explain why the priests misunderstood the rules laid down by Cæsar for the future regulation of the year, their neglect being wilful and not through ignorance. Nobody can understand why Cicero should speak in so sarcastic a manner about beginning the year with the day of the new moon, if Julius Cæsar made that commencement to gratify the superstitious notions of the Romans. That only means they were accustomed, when they employed lunar months, to begin them with the new moon, and, after the abandonment of a year strictly lunar, to commence their technical epoch in the same way; any change in this respect would be unpopular. But if we understand the edict referred to the beginning of the year on the 25th of December, we may be able to comprehend Cicero as if he mistook the language of the edict in exactly the same way as the words of Macrobius have been misunderstood.

The effect of beginning the 1st of January on the 25th of December would be, as I have shown, to cause the 1st of Thoth to correspond with the 7th of September, B.C. 45.

In the following table I have set forth and contrasted the two places of the 1st of Thoth in the Julian year. It shows the incorrect intercalations, and what should be the correct ones. The table extends from B.C. 45 to A.D. 8, inclusive. In B.C. 9 I

have begun the legal 1st of Thoth corresponding by the incorrect intercalation to August 26, but by the correct, to what should have been the 29th of August.

Dates of 1st of Thoth in the Julian between B.C. 45 and A.D. 8.

According to the Adjustment that in B.C. 45 the 1st of Thoth of the Vague Year concurred with the 3d of September.				According to the Adjustment that in B.C. 45 the 1st of Thoth of the Vague Year concurred with the 7th of September.		
Julian Year.	Bissextile Year.	Date of 1st of Thoth according to correct intercalation.	Date of 1st of Thoth according to incorrect intercalation.	Date of 1st of Thoth according to correct intercalation.	Date of 1st of Thoth according to incorrect intercalation.	
45	B.	September 3.	September 3.	September 7.	September 7.	
44	..	.....	.....	.....	.....	
43	..	.....	.....	.....	.....	
42	..	.....	September 2.	.....	September 6.	
41	B.	September 2.	.....	September 6.	.....	
40	..	.....	.....	.....	.....	
39	..	.....	September 1.	.....	September 5.	
38	..	.....	.....	.....	.....	
37	B.	September 1.	.....	September 5.	.....	
36	..	.....	August 31.	.....	September 4.	
35	..	.....	.....	.....	.....	
34	..	.....	.....	.....	.....	
33	B.	August 31.	August 30.	September 4.	September 3.	
32	..	.....	.....	.....	.....	
31	..	.....	.....	.....	.....	
30	..	.....	August 29.	.....	September 2.	Battle of Actium.
29	B.	August 30.	.....	September 3.	.....	
28	..	.....	.....	.....	.....	
27	..	.....	August 28.	.....	September 1.	
26	..	.....	.....	.....	.....	
25	B.	August 29.	.....	September 2.	.....	
24	..	.....	August 27.	.....	August 31.	
23	..	.....	.....	.....	.....	
22	..	.....	.....	.....	.....	
21	B.	August 28.	August 26.	September 1.	August 30.	
20	..	.....	.....	.....	.....	
19	..	.....	.....	.....	.....	
18	..	.....	August 25.	.....	August 29.	
17	B.	August 27.	.....	August 31.	.....	
16	..	.....	.....	.....	.....	
15	..	.....	August 24.	.....	August 28.	
14	..	.....	.....	.....	.....	
13	B.	August 26.	.....	August 30.	.....	
12	..	.....	August 23.	.....	August 27.	
11	..	.....	.....	.....	.....	
10	..	.....	.....	.....	.....	
9	B.	August 25.	August 22.	August 29.	August 26.	Intercalations commenced in the Egyptian Year.
8	..	.....	.....	.....	.....	
7	..	.....	.....	.....	.....	
6	..	.....	.....	.....	.....	
5	B.	August 25.	(Omitted.) 1st Thoth = 23d.	August 29.	(Omitted.)	Thoth 1 advanees to the 27th of August.
4	..	.....	.....	.....	.....	
3	..	.....	.....	.....	.....	

Dates of 1st of Thoth in the Julian between B.C. 45 and A.D. 8 (Continued).

According to the Adjustment that in B.C. 45 the 1st of Thoth of the Vague Year concurred with the 3d of September.				According to the Adjustment that in B.C. 45 the 1st of Thoth of the Vague Year concurred with the 7th of September.		
Julian Year.	Bissextile Year.	Date of 1st of Thoth according to correct intercalation.	Date of 1st of Thoth according to incorrect intercalation.	Date of 1st of Thoth according to correct intercalation.	Date of 1st of Thoth according to incorrect intercalation.	
2	..	.....	.....	.....	.....	
1	B.	August 25.	(Omitted.) 1st Thoth = 25th.	August 29.	(Omitted.)	Thoth 1 advances to the 28th of August.
A.D.						
1	..	.....	.....	.....	.....	
2	..	.....	.....	.....	.....	
3	..	.....	.....	.....	.....	
4	B.	August 25.	(Omitted.) 1st Thoth = 24th.	August 29.	(Omitted.)	Thoth 1 advances to the 29th of August.
5	..	.....	.....	.....	.....	
6	..	.....	.....	.....	.....	
7	..	.....	.....	.....	.....	
8	B.	August 25.	August 25.	August 29.	August 29.	

The two historical facts to be conformed to are the date of the battle of Actium, which, according to Dion Cassius, was the 2d of September, the fourth of the nones of September, and the legal 1st of Thoth, falling normally on the 29th of August. By inspection of the foregoing table, it will be found that, according to the adjustment that B.C. 45, 1st of Thoth, concurred with September 7, the vague 1st of Thoth fell on the 2d of September, B.C. 30, and this, by the real but incorrect intercalation, showing that if the battle of Actium was fought in the year B.C. 30, it was truly fought on the 1st of Thoth.

The table in this connection shows that in B.C. 9, the last year which was incorrectly intercalated, and which completed the error which Augustus at that time proposed to correct, the 1st of Thoth fell on the 26th of August by the incorrect intercalation; the correct would have made the corresponding term of the Julian to be August 29. From this point on for twelve years the Julian does not receive any intercalation, three such days being omitted. At the time of the Augustan reformation began that of the Egyptian year; in other words, when the

intercalations stopped in the Roman year they began in the Egyptian, and were added in those years in which those of the Roman should have been added were it not necessary to omit them for the purpose of correcting the error into which that time-measure had fallen. These were the years B.C. 5 and 1 and A.D. 4. By this means the Julian became a vague year for the time being, and the Egyptian, having the true character of the Julian, advanced in the latter three days, from the 26th of August to the 29th of the same month, and then stopped, because when the next bissextile year came round, the twelve years having expired, both years received intercalations in that same year, and continued to receive them in the same years, the 1st of Thoth ever afterwards, during the Roman dominion in Egypt, falling on the 29th of August.

Some chronologists place the battle of Actium as happening in B.C. 31. But this is contrary to the astronomical canon, which they profess to follow, but do not hesitate to depart from to the difference of a year or two, if they think it necessary. According to the canon, Cleopatra began to reign in B.C. 52, and she reigned twenty-two full years; therefore her last full year began in B.C. 31 and ended in B.C. 30. A writer on the canon says, "It is proved beyond all doubt that the principle on which the length of reign of the Roman emperors is assigned is the following: The epoch of each reign is the 1st of Thoth immediately preceding the proclamation, even if the date of the proclamation lies towards the end of the year."* This being the case, Augustus's first year, which began in B.C. 30, includes all that portion of Cleopatra's reign which exceeded the full twenty-two years given her in the canon.

If the battle of Actium was fought in B.C. 31, then, as Cleopatra's full years did not terminate until the 1st of Thoth in B.C. 30, which according to the usual adjustment of the Roman and Egyptian years, by the incorrect intercalation, corresponded at that time to August 29, and as Cleopatra died in the same month, and the final subjugation also took place in it, it follows that by the principle of the canon Augustus should claim as his own all that last year of the Egyptian queen, because he surely

* "Ordo Sæclorum," § 437.

became master of Egypt before its close. All trouble is avoided by placing the battle of Actium in B.C. 30. If it was fought on September 2, which by my arrangement of these years corresponded to the 1st of Thoth, B.C. 30, and if the final subjugation of Egypt was finished in August of the following Julian year, then, as the vague year began and ended in September, both the battle of Actium and final subjugation fell in with the same vague year; that is, the one which began in B.C. 30 and ended in September, B.C. 29. It makes no difference whether Augustus's reign is reckoned from the death of Cleopatra, the final subjugation of Egypt, or the battle of Actium, because these events all happened in the same vague year, which is reckoned by the rule of the canon as his first year.

From a review of the whole subject, the adjustment of the Egyptian vague year to the Julian, it is clear the observation made by Timocharis in B.C. 272 was a very important one.

CHAPTER III.

SOTHIC AND PHŒNIX CYCLES.

THE tradition of the Sothic cycle, called by the Latins "Canicular," is, it equalled in length fourteen hundred and sixty Julian years, and recognized the retention of the vague because fourteen hundred and sixty-one vague years contain the same number of days as fourteen hundred and sixty Julian. The fourteen hundred and sixty-first vague year is technically intercalary and uncounted, and the period is put at fourteen hundred and sixty years, while practically its length was fourteen hundred and sixty-one vague years. These fourteen hundred and sixty-one vague years were taken to be equal to fourteen hundred and sixty sidereal years, and according to the accounts the supposition was, if the 1st of Thoth began with the heliacal rising of Sirius, the Dog-star, then after four years Sirius would rise again, in the same manner, on the 2d of Thoth, and so on through the year, rising one day later in the vague every four

years. In this way it would take the star fourteen hundred and sixty years to rise in succession on all the days of the vague year. The advance of the sidereal was supposed to be the same as the falling back of the 1st of Thoth in the Julian, it moving backward through this year one day for every four years. The sidereal year (the time it takes the sun to move from a fixed star and return to the same again) is longer than the Julian, and will gain a clear day over it in one hundred and sixty years, so that, in this sense of the sidereal year, the cycle could not be strictly followed, or, at least, the tradition must be modified in some way for it to accomplish its end. If it followed the usual rule, the moon should enter as a factor for its determination.

Censorinus says that this was not the case. Writing A.D. 238, his words are, "*Ad Ægyptiorum vero magnum annum luna non pertinet*," etc. "In the great year of the Egyptians which the Greeks call the Cynic, and we in Latin the Canicular, the moon is not taken into consideration, inasmuch as its commencement is fixed when Canicular rises upon the day of that month which the Egyptians call Thoth."*

Censorinus means either that it is impossible to take the moon into consideration, the period not being lunar, or that the description of the cycle makes no mention of such a fact. In the latter case the omission is not conclusive either way. The moon was universally taken into account in forming cycles. As to the period not being lunar, whether it is, or is not, is not at issue, but the point is, Is the period near enough lunar to be mistaken for such? I find that 18,058 mean synodical months contain 533,263 days, 9 hours, and 34 minutes *plus;* and 19,518 sidereal months have 533,264 days, 4 hours, and 14 minutes *plus;* and 1461 vague years are equal to 533,265 days.

If the knowledge of the Egyptians at the time of the decree of Canopus, B.C. 238, was deficient as to the true length of the sidereal year, it is also probable they were also inaccurate in the measurement of the lunar month. I do not mean, in this last case, that their ignorance was grossly so. If the mean lunar month is made but three seconds longer than it is, it will have

* Cory's "Fragments."

an excess of over fifteen hours in fourteen hundred and sixty years, which is more than enough to account for a belief that a lunar period concurred with a Sothic cycle. I hope to be able, shortly, to show the reasonableness of the hypothesis that originally the sidereal cycle was not of the length of fourteen hundred and sixty-one vague years, but was a period which could be measured by lunar and sidereal months, which is very nearly true of the Sothic, as is shown by the figures just given, and the failure in its case being the origin of the mistake, that the moon did not enter into the cycle.

I offer the following as the true Sothic cycle. The Sothic cycle, as the *Annus Magnus*, or Great Year, may be divided into three Great Seasons, in analogy with the three seasons of the common Egyptian year. For technical reasons these seasons are not all of the same length. Season I. is of five hundred and forty years, in which time the rising of the star advances four months and fifteen days. Season II. is also of five hundred and forty years, in which the advance of the star is from the 16th of the month Tybi four months and fifteen days. Season III. is of only three hundred and eighty years, in which time the star advances three months and the five intercalary days, and completes the circuit of the vague year:

Season I.	= 540 vague years	+ 135 days.	
Season II.	= 540 " "	+ 135 "	
Season III.	= 380 " "	+ 95 "	
	1460 " "	+ 365 "	

Season I.	= 7219	sidereal months	*minus*	0 day,	1 hour,	40 minutes	+
Season II.	= 7219	" "	*minus*	0 "	1 "	40 "	+
Season III.	= 5080	" "	*plus*	0 "	23 hours,	6 "	+

Great Year = 19,518 sidereal months *plus* 0 day, 19 hours, 45 minutes +

Season I.	began	with	the	1st of Thoth.
Season II.	"	"	"	16th of Tybi.
Season III.	"	"	"	1st of Payni.

The decree of Canopus, B.C. 238, is dated "in the year IX., 7th month Apellæus, the 17th of Tybi." It informs us "the

rising of the Divine Sothis (Sirius) at present occurs in his 9th year, the 1st of Payni." This heliacal rising in B.C. 238 on the 1st of Payni was at the beginning of the third season of the Great Year, and by it we obtain the following epochs for the other seasons:

Season I.	Heliacal rising	1st of Thoth,	B.C.	1318.
Season II.	" "	16th of Tybi,	"	778.
Season III.	" "	1st of Payni,	"	238.

The first season, B.C. 1318, which is in this way found to be the beginning of the Sothic cycle, has the 1st of Thoth corresponding with the 16th of July of the Julian year, according to the method by which the dates of the vague year are adjusted to the Julian, as explained in the previous chapter. The 16th of July, B.C. 1318, was the day of the full moon, and in this way the cycle is commenced with a heliacal rising of Sirius, a full moon, and a sidereal moon. The sidereal month, in this case, is reckoned from full moon; the sidereal month is determined by the return of the orb, and not by the phases of the moon.

An inscription pointed out by Dr. Brugsch and mentioned by Mr. Cooper (*Athenæum*, May 11, 1861) contains the statement that Sirius had risen heliacally on the 1st of Tybi, in the eleventh year of Takelath II. "His eleventh regnal year, therefore, concurred with the year B.C. 832." For this fact I am indebted to Von Gumpach ("Baby-Worlds"). I have found that Season II. began with the 16th of Tybi, B.C. 778. There is a difference of fifty-four years and fifteen days between this date and the 1st of Tybi, B.C. 832. The star will advance in this time to the 15th of Tybi. But the special heliacal rising has been limited by the conditions prevailing at the beginning of the first season, which had full moon on the 1st of Thoth, concurring with July 16; also, by the constitution of the cycle, to the 16th of Tybi for the beginning of the second season. In the year B.C. 778, the 16th of Tybi coincided with July 16, and this was also the day of the full moon.

The decree of Canopus definitely settles the year and date I have put for the commencement of the third season. Sirius rose on the 1st of Payni, and this date coincided, B.C. 238, with the 16th of July, which was also the day of the full moon.

The dates of the three great seasons thus obtained are as follows:

Season	I.	B.C. 1318, 1st of Thoth	=	July 16,	full moon.
Season	II.	" 778, 16th of Tybi	=	"	"
Season	III.	" 238, 1st of Payni	=	"	"

In the year A.D. 143, when this period of fourteen hundred and sixty-one vague years came to an end, the 1st of Thoth of the vague year coincided with the 16th of July, and the new moon was on the 30th of June. The full moon was on the fifteenth day thereafter,—the 15th of July.

The historical termination of this cycle is connected with matters bearing upon the adjustment of the vague to the Julian year, which have already been discussed. The authorized date of the 1st of Thoth in the Julian B.C. 45 is September 3, and this is implied by the vague 1st of Thoth concurring with July 20, A.D. 138. I shall not here repeat my argument to show that this is incorrect, but only wish to say the dates July 16, coinciding with the Egyptian dates as above given, are inconsistent with the date September 3, unless it can be shown that between B.C. 238 and 45 the vague year was advanced three days in the Julian. The general opinion among the learned has been that the Sothic cycle began in the year B.C. 1322 with the 1st of Thoth, on the 20th of July, and that it ended A.D. 138 with the same coincident dates of the Julian and vague years. The date for its beginning is without any known contemporary observation, and is dependent upon a tradition that would make it fall about that time, and on a calculation which has for its basis a heliacal rising of Sirius on the 20th of July, and the 1st of Thoth, A.D. 138.

Dr. Sharpe, in his "History of Egypt," has the following: "The beginning of the reign of Antoninus Pius was remarkable as being the end of the Sothic period of fourteen hundred and sixty years; the movable New-Year's day of the calendar had come round to the place in the natural year from which it first began to move in the reign of Menophres, or Thothmosis III.; it had come round to the day when the Dog-star rose heliacally. If the years had been counted from the beginning of this Great Year, there could have been no doubt when it came to an end,

as from the want of a leap-year the New-Year's day must have been moving one day in four years; but no satisfactory reckoning of the years had been kept, and as the end of the period was only known by observation there was some little doubt about the exact year. Indeed, among the Greek astronomers, Dositheus said the Dog-star rises heliacally twenty-three days after midsummer, Meton twenty-eight days, and Euctemon thirty-one days; they thus left a doubt of thirty-two years as to when the period should end, but the statesmen placed it in the first year of the reign of Antoninus. This end of the Sothic period was called the return of the phœnix, and had been looked forward to by the Egyptians for many years, and is well marked on the coins of this reign."*

The summer solstice in the time of Antoninus was on the 23d day of June. The explanation which I am about to give, as to how these twenty-eight days were obtained for Meton, will not only show their factitious character, but will go to prove that July 16, and not July 21, was the proper day.

In the year B.C. 1318, if the star rose on the 16th of July, it rose twelve days after the summer solstice, which was on the 4th of this month. From B.C. 1318 to B.C. 432 are eight hundred and eighty-six years. If the calculation is by the precession of the star in the tropical year, it will, between these years, amount to twelve days, twelve hours *plus*. The portion of a day is discarded, because the exact hour of the summer solstice is not taken into the account. We have, then, the time the star rose after the summer solstice B.C. 1318, which was twelve days, *plus* the precession last obtained of twelve more days, giving for the number of days the star will rise in B.C. 432 after the summer solstice, twenty-four days. The summer solstice in B.C. 432 was on the 27th of June, and twenty-four days thereafter will bring the heliacal rising to the 21st of July. From B.C. 432 to A.D. 138 the precession in the *Julian* is three days, fifteen hours, which, with the twenty-four days we found for the tropical, will give twenty-eight days for the time the star falls after the summer solstice in A.D. 138. In A.D. 138 the summer solstice was on June 23, which gives for the twenty-eight

* "History of Egypt" (Samuel Sharpe), chap. xv. (32).

days thereafter the 21st of July. By this the calculation is in part by the tropical and in part by the Julian, and consequently inaccurate as to the precession of the star in the tropical year.

Dositheus is given as the authority for the statement that Sirius rose twenty-three days after midsummer. In the time of Antoninus, as I have said, the summer solstice was on the 23d of June, and twenty-three days thereafter will bring the rise of the star to the 16th of July, thus confirming, as far as this testimony goes, the date I have calculated. This same calculation may be made from the rise of the star on the 16th of July, B.C. 238.

The calculation of Euctemon may be obtained in the following way: By the arrangement which I have proposed in the previous chapter, the one which causes September 7 to concur with the 1st of Thoth, B.C. 45, if the correct interealations are followed,—that is, if B.C. 9, the 1st of Thoth, fell in with the 29th of August,—then in A.D. 138, which is one hundred and forty-six years after, the precession of the Julian will be thirty-six days. The vague 1st of Thoth will fall back that many days to July 24, which is thirty-one days after the summer solstice.

These calculations are made from statements of astronomers who lived between B.C. 200 and B.C. 432. That of Meton is made in reference to the tropical year B.C. 432, and applying it to the time Sirius should rise after the summer solstice in the time of Antoninus is but repeating the mistake the priests made in B.C. 238, when they imagined by adding a day every four years they would keep the star to the 1st of Payni and the seasons to the dates they then held; that is, the idea that the year of the seasons and the sidereal year coincided.

The plan of the Sothic cycle, which I have so far advocated, does not take into account the precession of the star in the Julian; it simply requires the special heliacal rising to be the one occurring on the day of the full moon next following the summer solstice. In this way the precession of the star in the Julian for fourteen hundred and sixty years of nine days, *plus*, is avoided, and the precession of the heliacal rising of the star in respect to the tropical is made to be the same as that of the

Julian in the tropical year; that is, the summer solstice starting twelve days before July 16, B.C. 1318, falls back eleven days to June 23, A.D. 143.

THE PHŒNIX CYCLE.

In connection with the termination and beginning of the Sothic cycle, in the quotation taken from Mr. Sharpe, we are informed that they also celebrated the return of the phœnix. The Phœnix year or cycle is described by Greek and Latin writers in a fabulous manner. The phœnix was a bird of beautiful plumage, and very long-lived. When it dies, a young bird is produced from the dead body of its father. The length of the fabulous life of this bird is supposed to be that of a cycle. The description is given in language peculiar to the myth, and, translated into plain speech, means one cycle was succeeded by another like itself. The length of this cycle is variously put. Some give it the same length as the Sothic,—fourteen hundred and sixty-one years; others say it was for six hundred and sixty; six hundred; five hundred and forty; and five hundred years. Censorinus, in speaking of the Canicular, which is confounded with the Phœnix, says it was called *ὁ ἐνιαυτός*, the year. He uses a Greek word which is used to denote periods of time, or great years, such as cycles. The meaning of the word phœnix has been explained through the word in the Greek, which means a palm-tree, the date-tree, back to the Egyptian, who used a palm-branch as the hieroglyphic of the year. If the Phœnix cycle was of five hundred and forty years, or if this number of years was the length of one of its great seasons, we can readily see how one could be confounded with the Sothic cycle. It follows also that if the Sothic was an outgrowth of the phœnix, we must place the origin of the former to the period between B.C. 238 and A.D. 143. For up to B.C. 238, if my explanation of the Sothic is correct, the first two seasons of that great year were the same as those of the Phœnix year. These first two seasons of the Sothic are of such a character that they far surpass the third season of that cycle in all those things which properly belong to cycles or their subdivisions. The Sothic cycle could not be repeated in exactly the same form.

The use of the Phœnix is capable of being extended to two

thousand seven hundred years. A period of this many years begins in B.C. 1858 and extends to A.D. 843, and it may be divided into three great seasons, one beginning in B.C. 1858, the second in B.C. 958, and the third in B.C. 58. Each of these contains nine hundred years. I propose a cycle of two thousand one hundred and sixty or sixteen hundred and twenty years, according as it is given three or four seasons of five hundred and forty years.

B.C. 1858	0	Date, 21st of Pharmuthi	=	16th of July.
" 1318	540	" 1st of Thoth	=	"
" 778	540	" 16th of Tybi	=	"
" 238	540	" 1st of Payni	=	"
	1620 years.			
A.D. 303	540	" 16th of Phaophi	=	"
	2160 "			

The astronomical basis of the cycle is that five hundred and forty Julian years are longer than six thousand six hundred and seventy-nine lunar months by only four hours, thirty minutes, and three seconds, and longer than seven thousand two hundred and nineteen sidereal months by one hour, forty minutes, and thirty-eight and a half seconds.

CHAPTER IV.

THE HENTI.

THE meaning of the word *Henti* is in doubt. By some it is applied generally to cycles such as the Sothic, etc. In a note appended to M. P. Le Page Renouf's translation of Queen Hatasu's inscription on the base of the great obelisk of Karnak ("Records of the Past") is the following: "Double period equal to Henti, a period of one hundred and twenty years, here 'the time to come.'" * M. E. De Rougé describes the Henti as a

* "Records of the Past," vol. xii. p. 127.

long period, the numerical value of which was not known. He says it is used in a *résumé* of mythological reigns in the Turin Papyrus to denote a period of thousands of years.* The use of the word in two or more senses, following an analogy, is consistent with the ancient practice. Just as a day, week, month, year, and cycle are used in their ordinary sense, and technically to describe longer periods to which they stand in the relation of great day, great month, etc., so the Henti may be employed to describe, in its first use, a definite period of time, and, secondly, greater periods, and also, indefinitely, great but undetermined periods, such as "thousands of years." In the following hypothesis it is not intended to include the question of the original meaning of the word. Still, in assuming that the Henti denoted a period of one hundred years, one cannot but be struck with the resemblance this word has to others having that meaning in a family of languages. But such resemblances are misleading unless the meaning of the word is positively known. Cycles are of two kinds. One is a time-measure deriving its length directly from the repetition of astronomical phenomena, like the return of the coincident points of lunar and solar time. The other, while it is referable to the same kind of phenomena, is more directly a division of time assumed for convenience of counting, and is a direct outgrowth of a mathematical system, such as the decimal. One hundred years is a cycle in the latter sense. Herodotus speaks of the Egyptians counting time by generations, three of which made up a century. Are we not to look for some recognition of the century on the monuments, if this were the case? Its general use as a round number for years, were we without the testimony of Herodotus, would lead to the expectation of finding it, and if not, the presumption is so strong in its favor that some apology must be made for its absence. The twelve hundred months of one hundred vague years may be divided into generations, three to a century, which will give four hundred months to a generation. These cannot be divided into years of twelve months without a remainder over of months. But by continuing the decimal system to the subdivision of this cycle they form three generations or epi-

* "Dictionnaire d'Archéologie Égyptienne" (Pierret), *Année.*

cycles each of forty decimestrial years, and one hundred years contain one hundred and twenty such years.

Did the Egyptians make use of, for any purpose, a division of time of ten months? Dr. Brugsch offers the hypothesis that "the little year" of an inscription of the time of the twelfth dynasty was the lunar. He means one of twelve months. But if they recognized any such, it must have been in connection with the vague year by some kind of cycle. By using a year of ten months this could be done in a very symmetrical manner. The Egyptians are credited with a cycle called the Apis. It is composed of twenty-five vague years. This number is taken because that many years are only one hour, nine minutes, and eighteen seconds longer than three hundred and nine synods of the moon. Four Apis cycles form a total of one hundred years, and are four hours, thirty-seven minutes, and twelve seconds longer than twelve hundred and thirty-six lunar months.

The three hundred and nine lunar months of each cycle may be formed into thirty decimestrial years, with nine intercalary months, which were added in one body, according to the Egyptian practice, and probably at the beginning of the cycle. The reason for this last statement is obtained from the inscriptions of the Apis stêlæ discovered by Mariette. From these we learn that a period of nine months regularly intervened between the birth of the Apis bull and his introduction into the temple. This will give for one hundred years one hundred and twenty lunar vague years, with the subdivisions of four generations of thirty decimestrial years. Again, the twelve hundred and thirty-six lunar months of the one hundred years may be divided into three generations of four hundred and twelve months each, or forty lunar years of ten months, with an intercalary year of twelve months.

The employment of several years by the Egyptians must be understood to mean that they used various time-measures which were called years, and that none of these were independent of the vague, but marked it off into greater or smaller periods.

Dr. Birch says, "Philologically, it has been attempted to be proved that there were two years, from such expressions as 'the first year,' *ap tep*, or *rempa;* 'the opening of the year,' *ap rempa* and *un rempa;* and 'the ending year,' *arg rempa;* but doubt is

thrown upon the philological position by the consideration that *ap rempa* may mean 'yearly,' as *ap abut* means 'monthly' in the Rosetta inscription."* May not this term "monthly" refer to a division of a cycle called a month; that is, a great month? It is used in connection with the cycle of which Epiphanes became the eponym in B.C. 196. But, be this as it may, they undoubtedly used the terms year and month, in the time of the Rosetta stone, in two senses, or we must confine the tradition of the Sothic to a very late period. The testimony of ancient writers is often in this direction. Suidas† says they called a year a day; Diodorus Sieulus,‡ a year a revolution of the moon; and Eusebius§ clinches it with "*enim mensem unum illi annum vocabant.*" It is true, writers have used this fact to reduce periods of years which they think to be unreasonably long; but in doing this they have reversed the proceeding. The Egyptians might call a thousand years a day, but never, correctly, a day a thousand years. The distinction is that where such usages occur the period, instead of being decreased by rendering the terms into ordinary days and years, should be numerically increased by that operation.

The employment of the Henti in the mythologieal reigns has the following scope. The thirty dynasties of the Old Chronicle are said to reign thirty-six thousand five hundred and twenty-five years, "which number of years, resolved and divided into its constituent parts, that is to say, twenty-five times fourteen hundred and sixty-one years, shows that it relates to the fabled periodieal revolution of the Zodiac; that is, its revolution from a particular point to the same again, which point is the first minute of the first degree of that equinoctial sign whieh they call the Ram, as it is explained in the Genesis of Hermes, and in the Cyraunian books."‖

It must be noticed that there are two contemplations of the Egyptian year in reference to the period of the Sothie cycle, and these follow it through longer periods and developments. One contemplates the real fact,—that is, the year is always of three

* "The Ancient Egyptians" (Wilkinson), vol. ii. p. 372.
† Cory's "Fragments," p. 160. ‡ Ibid., p. 164. § Ibid., p. 92.
‖ Ibid., p. 91.

hundred and sixty-five days; the other looks upon the Sothic period of fourteen hundred and sixty-one vague years as if it were only fourteen hundred and sixty years, to which have been added one day every four years. In other words, one considers the fact that four vague years equal fourteen hundred and sixty days; the other that four years of the Sothic period amount to the *average* of fourteen hundred and sixty-one days. It is owing to this that the Egyptian year is so often misunderstood.

Some have supposed what was merely a contemplation to be an actual fact; that is, they had a year to which a day was added every four years, and back of this was a like misconception,—that the year was of three hundred and sixty-five and a quarter days. These numbers are all factors in the development of the great period, viz.:

Real year,	365 days.	Fictitious year,	$365\frac{1}{4}$ days.
" quadrennial,	1460 "	" quadrennial,	1461 "
" Sothic period,	1461 years.	" Sothic period,	1460 years.

In connection with greater periods than the Sothic, but which are developed from it, the Henti, if we may so call the cycle of one hundred years, enters as a unit. One hundred years are a great day; three hundred and sixty-five great days, or thirty-six thousand five hundred years, form a great year; three hundred and sixty-five and a quarter fictitious great days equal one fictitious great year, or thirty-six thousand five hundred and twenty-five years; and four of these last make one hundred Sothic cycles, or one hundred and forty-six thousand one hundred years.

Dr. Lepsius explains the period of thirty-six thousand five hundred and twenty-five years to be the sidereal year caused by the precession of the equinoxes, imperfectly comprehended, but expressed in its greatest period of thirty-six thousand five hundred and twenty-five years.

CHAPTER V.

THE SET OR CYCLE OF THIRTY YEARS.

This cycle, called by the Greeks Triakonteris, is repeatedly mentioned upon the monuments. "In the reign of Pepi mention is made for the first time on the monuments of his day of a festival closely connected with the chronology of Egypt, called Hib-set, 'the festival of the tail,' in memory of the end and the beginning of a new period of years. In the eighteenth year of his government took place the renewal of Hib-set, on the first section of 'the feast of the tail,'—that is, 'the cycle of thirty years.' A learned German, Mr. Gensler, who has specially occupied himself with inquiries and learning relating to the course of the stars in connection with the information of the monuments, appears to us to have established the right view by his hypothesis, that the cycle of thirty vague years served to regulate according to a fixed rule of numbers the coincident points of the solar and lunar years by means of a great period of eleven synodic months intercalated in the years 0, 4, 7, 10, 12, 14, 16, 18, 20, 23, 26, 30 (= 0) of the period. The real nature of this cycle of thirty years seems to us contained in the previously-mentioned period of years which, as we said, were connected with the sun and moon. The Greek translator of the holy term Hib-set, in the Egyptian part of the celebrated Rosetta stone, renders this expression by the term period of thirty years."* I fail to see what Dr. Brugsch discovers in Mr. Gensler's hypothesis.

Thirty vague years contain ten thousand nine hundred and fifty days, and three hundred and seventy-one synods of the moon equal thirty lunar years of twelve months *plus* eleven intercalary months. This period of lunar months (three hun-

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. viii. pp. 102, 103. Eng. trans.

dred and seventy-one) contains ten thousand nine hundred and fifty-five days, twenty hours *plus*, which is five days, twenty hours *plus* more time than thirty vague years. If thirty Julian years are intended, then the lunar period is over a day too short. By a cycle of thirty years the coincident points of the solar and lunar years are not preserved. It is unreasonable to suppose the Egyptians made use of such a cycle, when a better one was at hand, the Apis cycle, with the "coincident points" for each only separated by one hour, eight minutes, thirty-three seconds.

There are several notices of these thirty years', or jubilee, festivals. In the reign of Rameses II. his jubilee, or thirty years' festival, was celebrated with great applause throughout the country. "The return of this festival also seems to have been reckoned according to a fixed cycle of years, perhaps when the lunar and solar years coincided at short intervals of three or four years, in the same manner as the festivals. In the thirtieth year Khamus celebrated the feast under his own superintendence, according to usage and prescription, in Bigeh and Silsilis, where, at that time, Khai was governor of the district, while at El Kab the governor Ta conducted the festivities. The repetition of the succeeding jubilees took place,—the second in the thirty-fourth year, the third in the thirty-seventh year, and the fourth in the fortieth year of the reign of Rameses II."* If I am not mistaken, the festivals of the years 30, 34, 37, and 40 have been used by Mr. Gensler to indicate those of the first ten years of his cycle which receive intercalations. Years 0, 4, 7, and 10 correspond as to their relative positions to years 30, 34, 37, and 40, and this is why he weakens his cycle at another point, by allowing only two intercalations in a period of nine years, when the proper number is three in eight years. Again, from year 23 of the cycle to year 4 of next cycle, excluding both extremes which receive intercalations, is a space of ten years containing only two intercalary years, the twenty-sixth and the thirtieth. In no way are the "coincident points of lunar and solar time" preserved. The constitution or genius of the Egyptian system requires the retention of the vague year. It seems to me the

* Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xiv. p. 110. Eng. trans.

better plan to follow, in the investigation of this subject, is to search for some reason for the observance of the jubilee cycle of thirty years, which, while retaining the vague, will group a fixed number of these years into cycles.

The first point to be determined is the number of years in the cycle. This has been understood to be thirty. But is this the case? The festival, it is true, is connected with a thirtieth year, but, if it was at the beginning of the cycle, then it began a period of twenty-nine years: a first year is a thirtieth counting from the first year of the previous cycle. Now, twenty-nine years is a solar period; in this time the tropical year advances in the vague seven days, no hours, thirty-five minutes, and twelve seconds. Again, if we understand four of these cycles of twenty-nine years were counted each from a different tropical point, each measuring separately the tropical period, which would show a nicety in the mode of measurement creditable to the Egyptians, there will be four distinct festivals celebrated. To one of these, that at the summer solstice, more importance will, perhaps, be attached; at least, we might expect it in some instances, in accordance with the important, but not exclusive, place this point of the sun's annual course held in their system of time-measurement.

If these festivals of Rameses II. are treated in this way the cycles will be according to the following table. I have provisionally headed the four columns containing the years of the four cycles, summer solstice, autumnal equinox, winter solstice, vernal equinox, as denoting the points of the year at which their first years begin.

	Summer Solstice.	Autumnal Equinox.	Winter Solstice.	Vernal Equinox.
J. 30	1	26	23	20
31	2	27	24	21
32	3	28	25	22
33	4	29	26	23
J. 34	5	1	27	24
35	6	2	28	25
36	7	3	29	26
J. 37	8	4	1	27
38	9	5	2	28
39	10	6	3	29
40	11	7	4	1

If the cycle of twenty-nine years is begun with a tropical point at the beginning of the civil day it will continue to fall seven days later for each cycle in the vague year for forty-one cycles or eleven hundred and eighty-nine years, when it will pass to the eighth day, and then will continue to fall seven days later, as before. The advance of the tropical year for eleven hundred and eighty-nine years is two hundred and eighty-eight days, which, divided by forty-one, gives seven days and one remainder. If a sufficient number of instances of these jubilee cycles can be obtained from the monuments to confirm this view of these cycles, they would render great help in settling the chronology of this nation.

CHAPTER VI.

EGYPTIAN CHRONOLOGICAL EPOCHS.

In the following endeavor to establish certain Egyptian chronological epochs I have confined myself to the period between the beginning of the eighteenth dynasty and the Persian invasion.

The epochs of three kings who reigned during this period furnish the starting-points from which other epochs—those of intervening kings—may be estimated. The three kings are Thutmes III., Rameses II., and Takelath II. Epochs of these will be determined by monumental data.

EPOCH OF THUTMES III.

This reign is the first to be considered, not on account of its importance in a political way, for Thutmes III. was the greatest king of this dynasty, but because an inscription of his furnishes some of the necessary facts by which may be established the epoch of his reign, and within very narrow limits that of the eighteenth dynasty of which he was the fifth king. One of

the many inscriptions relating to his reign gives an account of the laying of a foundation-stone of a temple at Thebes.

The portion to be noticed is as follows (Thutmes is speaking in the inscription): "I gave the order to prepare the cord and pegs (for laying of the foundation) in my presence. The advent of the day of the new moon was fixed for the festival of the laying of the foundation-stone of this memorial. In the year 24, on the last day of the month Mekhir, on the festival of the tenth day of Amon's festival on his splendid feast of Southern Ape."*

It was the custom of the Egyptians and other ancient nations to set up memorials of the events they wished not to be forgotten. An instance for the Jews were the twelve stones Joshua pitched in Gilgal for a memorial of their coming out of Jordan on the tenth day of the first month. These memorials served two purposes: to keep the memory of some important historical event, and, when they preserved the date of their erection, also the time of the same; and to commemorate some astronomical or chronological fact, or both, by means of which the year of the king's reign in which they were put up, or the year of some cycle to which they referred, might be known as long as the monument should last. A case for the Egyptians was the memorial-stone erected in the reign of Rameses II., which bore the inscription, "In the year 400, the month Mesori, the fourth day of King Set 'Apehuti-Nub."

We are furnished by the inscription of Thutmes III. with the fact that in the year 24 the new moon fell on the 30th of Mechir. We are to find the year in which the new moon fell on the 30th of Mechir; secondly, a 30th of Mechir with a new moon in connection with some other fact that will sever it from all others, and the significance of the year 24, whether it was a regnal year or one of a cycle. Although Egyptologists differ as to the epoch of the reign of Thutmes III., yet there are limits to their divergence, and at the outset the search will lie in a period covered by a hundred or so years. By the adjustment of the vague to the Julian, on the testimony of Timocharis, the 17th

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 384. Eng. trans.

of Mesori concurred with the 8th of October, B.C. 272. The advance of the Julian in the vague is one day every four years, and calculating back from B.C. 272, it is found that the 30th of Mechir fell on the 3d of January for four years from B.C. 1288 to 1285, inclusive. It is also found that the 3d of January, B.C. 1288, was the day of the new moon, and also of the winter solstice, and consequently the same is true of the 30th of Mechir in this year. We are to confirm this by the year 24. I now turn to the reign of Rameses II. We begin with the memorial-stone already alluded to. The portion demanding attention is as follows:

"His majesty (King Ramessu II.) gave orders to raise a great memorial of granite (of Syene) to the exalted name of his father, animated by the desire to uphold thereby the name of his (royal) father and his forefathers. May the remembrance of King Mineptah Seti II. remain and endure for ever, to-day and every day. In the year 400, the month Mesori, the fourth day, of King Set 'Apehuti-Nub, the friend of the god Hormakhu —may he live for ever and ever."*

The 4th day of Mesori is the date of this memorial. Following the clue furnished by the memorial of Thutmes III., and looking for something similar in this case, we find that from B.C. 1020 to B.C. 1017 the 4th of Mesori was at the vernal equinox, and in the year 1018 the 4th of Mesori was the day of the full moon. In B.C. 1018 the vernal equinox was on March 31 of the Julian year.

I next take up the jubilee cycles on record in this reign. The subject has been discussed in the exposition of the hypothesis of the Hib-set. The beginnings of these cycles are now to be adjusted to the reign of Rameses II. and the Julian year. In the following short table the thirty years' jubilee connected with the vernal equinox is begun with the jubilee of Rameses's fortieth year, and in the same year we have found for the memorial of King Nub. By this means I adjust these cycles to the Julian year.

The following is the table given on page 63, with the addition of the year before Christ:

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* "Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xiv. p. 94. Eng. trans.

B.C.	Years of Rameses II.	Summer Solstice.	Autumnal Equinox.	Winter Solstice.	Vernal Equinox.
1028	J. 30	1	26	23	20
1027	31	2	27	24	21
1026	32	3	28	25	22
1025	33	4	29	26	23
1024	J. 34	5	1	27	24
1023	35	6	2	28	25
1022	36	7	3	29	26
1021	J. 37	8	4	1	27
1020	38	9	5	2	28
1019	39	10	6	3	29
1018	J. 40	11	7	4	1

According to the explanation of these cycles which I have given, they each contain twenty-nine years and measure separately the tropical year. In Rameses II.'s first year began a cycle of the jubilee of the summer solstice. In his thirtieth year, B.C. 1028, he begins a second cycle of the same kind. This cycle of his thirtieth year "was the occasion of great festivities throughout the country." It was the first cycle of the kind celebrated by Rameses II. The special honor connected with this one is found in a pious belief that its renewal was a particular mark of the favor of the gods. The concluding words of the poem of Pentaur are, "May they (the gods) secure to him without end many thirty years' feasts of jubilee for ever on the chair of his father Tum, and may all lands be at his feet." This jubilee of his thirtieth year being the first instance of this special favor of the gods, receives very marked attention. The other jubilees mentioned—of the thirty-fourth year, B.C. 1024, of the autumnal equinox, of the thirty-seventh year, B.C. 1021, of the winter solstice, of the fortieth year, B.C. 1018, of the vernal equinox—all follow it.

The one of B.C. 1018 is the key of the whole arrangement. The following table carries a series of these cycles forward and backward from those in the reign of Rameses:

Table of Jubilee Cycles.

B.C.	Summer Solstice.	B.C.	Autumnal Eq.	B.C.	Winter Solstice.	B.C.	Vernal Eq.
1405	3d Mesori.	1401	3d Athyr.	1398	4th Mechir.	1395	3d Pachons.
1376	10th "	1372	10th "	1369	11th "	1366	10th "
1347	17th "	1343	17th "	1340	18th "	1337	17th "
1318	24th "	1314	24th "	1311	25th "	1308	24th "

Table of Jubilee Cycles (Continued).

B.C.	Summer Solstice.	B.C.	Autumnal Eq.	B.C.	Winter Solstice.	B.C.	Vernal Eq.
1289	1st Intercalary.	1285	1st Khoiakh.	1282	2d Phamenoth.	1279	1st Payni.
1260	3d Thoth.	1256	8th "	1253	9th "	1250	8th "
1231	10th "	1227	15th "	1224	16th "	1221	15th "
1202	17th "	1198	22d "	1195	23d "	1192	22d "
1173	24th "	1169	29th "	1166	30th "	1163	29th "
1144	1st Phaophi.	1140	6th Tybi.	1137	7th Pharmuthi.	1134	6th Epiphi.
1115	8th "	1111	13th "	1108	14th "	1105	13th "
1086	15th "	1082	20th "	1079	21st "	1076	20th "
1057	22d "	1053	27th "	1050	28th "	1047	27th "
1028	29th "	1024	4th Mechir.	1021	5th Pachons.	1018	4th Mesori.
999	7th Athyr.	995	11th "	993	12th "	989	11th "
970	14th "	966	18th "	964	19th "	960	18th "
941	21st "	937	25th "	935	26th "	934	25th "
912	28th "	908	2d Phamenoth.	906	3d Payni.	902	2d Intercalary.
883	5th Khoiakh.	879	9th "	877	10th "	873	4th Thoth.

As the vernal equinox was probably observed at noon of the 4th of Mesori, taking this as an era, each cycle forward or backward according to its number, counted from that of B.C. 1018 as year 0, begins on the date and at the time produced by multiplying seven days, thirty-five minutes, and twelve seconds by the number of cycles, and adding the product, if counting forward, or deducting, if counting backward, to and from, as the case may be, the 4th of Mesori twelve hours, noon. This is done to keep the error of the cycle, as far as this method will allow, from increasing.

The inscription of Amenemhib gives the length of the reign of Thutmes III. as follows:

35. "Behold then the king finished his course of life, after many years glorified by conquests, and by (sieges) 36, and by triumphs, beginning in the first year (and finishing) in the last day of Phamenoth, in the fifty-fourth year of his reign." *

Dr. Brugsch supposes this term to include also the reign of his sister Hatasou, who preceded him. Thutmes I. left three children,—Thutmes II., a daughter, Queen Hatasou, and Thutmes III. Queen Hatasou was associated with her brother Thutmes II. upon the throne. He, after a short reign, dies, and Hatasou assumes the whole authority. Her enmity to her brother, the deceased king, was such that she erased his name

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 355. Eng. trans.

from the monuments. Thutmes III. at this time was a minor, and passed his time in seclusion, and it was not before he reached man's estate that he was able to assume the power which was until then withheld from him by his sister.

Dr. Brugsch and others are of the opinion that Thutmes III. did not acknowledge the right of his sister to the throne, and therefore assumed as his own the years she reigned during his minority,—that is, from the death of Thutmes II.

But I have, for reasons which will appear, made Thutmes's reign not only to cover the time from the death of Thutmes II., but also from the death of their common father, Thutmes I.

I have provisionally begun the reign of Thutmes III., including in it the years of Thutmes II. and Queen Hatasou, in B.C. 1341.

The following table begins in B.C. 1347, the year of the jubilee of the summer solstice, and covers the fifty-three years, *plus*, of Thutmes's reign, and ends in B.C. 1287. I have also given in the same connection the concurrent reigns of Thutmes II. and Queen Hatasou:

	Jubilee Cycles.				Years of Thutmes II.	Years of Hatasou.	Years of Thutmes III.	Date of 1st of Thoth in the Julian.
B.C.	S. S.	A. E.	W. S.	V. E.				
1347	1	26	23	20				July 23.
1346	2	27	24	21				
B. 1345	3	28	25	22				July 22.
1344	4	29	26	23				
1343	5	1	27	24				
1342	6	2	28	25				
B. 1341	7	3	29	26	1		1	July 21.
1340	8	4	1	27	1–2		1– 2	
1339	9	5	2	28	2–3		2– 3	
1338	10	6	3	29	3–4		3– 4	
B. 1337	11	7	4	1	4–5		4– 5	July 20.
1336	12	8	5	2	5–6		5– 6	
1335	13	9	6	3	6–7		6– 7	
1334	14	10	7	4	7–8		7– 8	
B. 1333	15	11	8	5	8–9	1	8– 9	July 19.
1332	16	12	9	6	9	1–2	9–10	
1331	17	13	10	7		2–3	10–11	
1330	18	14	11	8		3–4	11–12	
B. 1329	19	15	12	9		4–5	12–13	July 18.
1328	20	16	13	10		5–6	13–14	
1327	21	17	14	11		6–7	14–15	
1326	22	18	15	12		7–8	15–16	

B.C.	Jubilee Cycles. S. S.	A. E.	W. S.	V. E.	Years of Thutmes II.	Years of Hatasou.	Years of Thutmes III.	Date of 1st of Thoth in the Julian.
B. 1325	23	19	16	13		8– 9	16–17	July 17.
1324	24	20	17	14		9–10	17–18	
1323	25	21	18	15		10–11	18–19	
1322	26	22	19	16		11–12	19–20	
B. 1321	27	23	20	17		12–13	20–21	July 16.
1320	28	24	21	18		13–14	21–22	
1319	29	25	22	19		14–15	22–23	
1318	**1**	26	23	20		15–16	23–24	
B. 1317	2	27	24	21		16	24–**25**	July 15.
1316	3	28	25	22			25–26	
1315	4	29	26	23			26–27	
1314	5	**1**	27	24			27–28	
B. 1313	6	2	28	25			28–29	July 14.
1312	7	3	29	26			29–30	
1311	8	4	**1**	27			30–31	
1310	9	5	2	28			31–32	
B. 1309	10	6	3	29			32–33	July 13.
1308	11	7	4	**1**			33–34	
1307	12	8	5	2			34–35	
1306	13	9	6	3			35–36	
B. 1305	14	10	7	4			36–37	July 12.
1304	15	11	8	5			37–38	
1303	16	12	9	6			38–39	
1302	17	13	10	7			39–40	
B. 1301	18	14	11	8			40–41	July 11.
1300	19	15	12	9			41–42	
1299	20	16	13	10			42–43	
1298	21	17	14	11			43–44	
1297	22	18	15	12			44–45	July 10.
1296	23	19	16	13			45–46	
1295	24	20	17	14			46–47	
1294	25	21	18	15			47–48	
B. 1293	26	22	19	16			48–49	July 9.
1292	27	23	20	17			49–50	
1291	28	24	21	18			50–51	
1290	29	25	22	19			51–52	
B. 1289	**1**	26	23	20			52–53	July 8.
1288	2	27	**24**	21			53–54	
1287	3	28	25	22			54	

I. The first point to be noticed is, the jubilee cycles are calculated back from the reign of Rameses II., or about two hundred and eighty years later than the time of Thutmes III.; and that

the years of these cycles fall in those of the reign of Thutmes by the simple force of numbers. There is no contrivance to make them so fall artificially. It was found that B.C. 1288, January 3 equalled Mechir 30, and the hypothesis was advanced that this year and these dates were those of the foundation of a temple at Thebes by Thutmes III. The one point left unsettled was the meaning of the year 24. By reference to the table just given, the number 24 will be found as the current year of the jubilee cycle of the winter solstice. The temple was founded in B.C. 1288 and year 24 of the jubilee cycle of the winter solstice of B.C. 1311, on the 30th of Mechir, concurrent with January 3, and day of the new moon and of the winter solstice. The year B.C. 1311 was also the epoch of the first year of the two series of Apis cycles described in a previous chapter, and Mechir 30, in B.C. 1288, fell on the last day of the twenty-third year of series beginning with Phamenoth and in the twenty-third year of the series beginning with Thoth.

II. The following additional historical facts are from the monuments. The first year Thutmes III. exercised his kingly power bears date year 15.* A rock-tablet at Wady Magharah shows Thutmes III. and Hatasou as joint rulers; it bears date the year 16.† Another rock-inscription, dated year 25, in Sabut-el-Khaden, mentions Thutmes as ruling alone.‡ By referring to the table it will be seen I have commenced to count the years of Hatasou at B.C. 1333, causing her first year to correspond with the last year of Thutmes II. This will make her sixteenth year begin with the twenty-fourth year, reckoned from the first year of Thutmes II., and which is also the twenty-fourth year of Thutmes III. on the hypothesis that Thutmes III. assumed the years of his elder brother and sister. If the reign of Hatasou terminated in this year, the sixteenth, then Thutmes III. will reign alone in year 25, agreeably to the monuments. I could have followed Thutmes II.'s ninth year with the first year of Hatasou; this would cause her sixteenth year to correspond with the twenty-fifth of Thutmes III., and her

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* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 314. Eng. trans.

† Ibid.

‡ Ibid., p. 405.

reign, coming to an end in this year, will still allow Thutmes to reign alone in his twenty-fifth year. But, for a reason which I am about to give, it seemed better that her sixteenth year should begin in B.C. 1318. Queen Hatasou had begun in the previous year, the year 15, an extraordinary work. On the base of an obelisk of the temple at Karnak an inscription bears the date year 16, and the information that the obelisk had been quarried, cut, and raised to its place in the short space of seven months.

This inscription has been used to show that the regal years did not commence with the 1st of Thoth, but between the months Mechir and Mesori. To give this turn to the inscription it is read to mean that the seven months were calculated "from the first day of Mechir of the fifteenth year of her reign to the last of Mesori of the following sixteenth year." This portion of the inscription, as rendered into English from the translation of P. Le Page Renouf, is as follows: "8. . . . My majesty began to work at this in the fifteenth year, and the first day of Mechir till the sixteenth year and the last day of Mesori, making seven months since the beginning of it in the mountain."* An entirely different view is suggested by this rendering. The year 16 placed at the head of the inscription is that following the completion of the obelisk. The work began in the year 15, 1st of Mechir, and lasted to the end of that year, just seven months. The five intercalary days belong to neither month nor year, consequently the date is put year 16, because the obelisk was completed at its advent. The difference between these two views is to understand the work to last either to the end of Mesori "till the sixteenth year," or to the end of Mesori "of the following sixteenth year." In order to carry out the latter view, Egyptologists are forced to call these regnal years, and to begin the sixteenth year between the months Mechir and Mesori. In a note appended to the English version of Renouf's translation occurs, "The years of a king count not from 1st of Thoth, but from the day of his coronation."

It is natural to look for some explanation of the extraordinary haste used in the erection of this obelisk.

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* "Records of the Past," vol. xii. 127.

The inference is that either at the beginning of the sixteenth vague year, counting the year from the 1st of Thoth, or within the sixteenth regnal year on the 1st of Thoth, some astronomical event was to happen for the celebration of which the completion of this obelisk was hastened. That the obelisk, in connection with its companion, which stood on the other side of the passage-way which ran through the middle of the Hall of the Osiride Figures of the temple at Karnak, served some astronomical purpose may be learned from the inscription; it is teeming with allusions of this kind:

"She hath made this as a monument to her father Amon . . . . and hath made for him two great obelisks of hard granite of the South."

"The sun's disk shines between them, as when it rises from the horizon of Heaven."

"I have entered into his designs; I have not neglected the business of the Universal Lord; I have, on the contrary, applied myself to it, for I know that Thebes is a heaven upon earth, it is the august staircase of the beginning of time, it is the ut'at of the Universal Lord, his heart's throne, which sustains his glories and holds within it all who accompany him."

(NOTE.—"The *ut'at* of the sun was said to be *complete* or *full* when one of the vertical points of his yearly course was reached.")

"I make this known to the Hamemet who will live in the double period, and whose hearts will inquire after this monument which I have made for my father."

(NOTE.—"*Henti*, a period of a hundred and twenty years; here 'the time to come.'")

"I rule over the land like the son of ISIS, I am victorious like the son of NUT. The Sun-god RA reposes in the SEKTI boat, he rests in the ATET boat, he consorts with his two mothers, the URÆUS goddesses, in the divine ship; the earth is fixed, the heaven is made stable."

(NOTE.—"The *sekti* is the morning boat of the Sun-god, *atet* the evening boat.")

"He hath made my bounds as far as the limits of heaven; the course of the sun's disk is at my service; he hath given it to her who is before him." According to the foregoing table the year

16 of Hatasou fell in B.C. 1318, and the 1st of Thoth of this year concurred with July 16, which was not only the day of the full moon, but also that of the heliacal rising of the Dog-star. The obelisk was finished on the last day of Mesori, five days before the rising of the star. There is a sufficient reason for the haste in the erection of the monument, if it is understood that these monuments were connected with the practical astronomy of the Egyptians.

III. Dr. Brugsch remarks on the fifty-three years *plus* given to Thutmes III. in the inscription of the Adon Amenemheb, these "including the years of the reign of his sister, whose sole reign appeared to him unjust and illegal. With this length of reign the Manethonian account of twelve years for the double reign of the two together, and twenty-six for his reign alone, in no way agrees. There must be a wrong mark inserted in the mutilated copies of the Manethonian rows of figures." *

In the following table of the first nine reigns of the eighteenth dynasty I have arranged the three copyists of Manetho with the table of Abydos. To Josephus I have given two sets of years. The first contains years and months, and the second only years.

In the first set the months by themselves sum up sixty-two, which is equal to five years and two months. These five years are in the second set added by the simple rule adopted mainly by Africanus and Eusebius, and the result shows that the three lists of the copyists are to all intents and purposes identical.

Table of the First Nine Years of the Eighteenth Dynasty.

Monuments.	Copyists of Manetho.		
Table of Abydos.	Josephus.	Africanus.	Eusebius.
1. Aahmes.	Tethmosis . . . 25. 4 –25	Amos 0	Amosis 25
2. Amenhotep I.	Chebron . . . 13 –13	Chebros 13	Chebron 13
3. Thutmes I.	Amenophis . . 20. 7 –21	Amenophthis . 24	Amophis. 21
4. Thutmes II.	Amesses . . . . 21. 9 –21	Amersis 22	(Omitted.)
5. Thutmes III.	Mephres . . . . 12. 9 –13	Misaphris . . . 13	Miphris 12
6. Amenhotep II.	Mephramutho-sis . . . . . 25.10 –26	Misphragmatho-sis 26	Misphragmutho-sis 26
7. Thutmes IV.	Tethmosis . . . 9. 8 –9	Tuthmosis . . . 9	Tuthmosis 9
8. Amenhotep III.	Amenophis . . 30.10 –31	Amenophis . . . 31	Amenophis . . . 31
9. Horemhib.	Orus. . . . . 36. 5 –37	Horus 37	Orus 37
	196.2–196	175	174

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 316. Eng. trans.

It will be seen that the copyists of Manetho do not follow the same order of reigns as found in the table of Abydos; some are transposed, and the identity of others obscured, by a corruption or misstatement of the names of the kings. The lists of Africanus and Eusebius agree with that of Abydos for the first and the seventh, eighth, and last king. The intervening reigns should agree. The second and third kings seem to be transposed by the copyists.

The list of Abydos omits Hatasou, who is given in the lists of Josephus and Africanus as Amesses or Amersis, who, according to Josephus, was the sister of Amenophis. Eusebius omits the woman-king. The list of Josephus sums up one hundred and ninety-six years and two months, or one hundred and ninety-six years; that of Africanus one hundred and seventy-five years; and that of Eusebius one hundred and seventy-four years. While Africanus and Eusebius are within one year of each other's total, they differ considerably in the earlier part of the dynasty. Africanus omits the years of Amos, who, according to Eusebius, reigned twenty-five years, and which is probably correct, because Aahmes's twenty-second year is found on the monuments, but Eusebius omits the years of Amersis, who, according to Africanus, reigned twenty-two years; this lessens the excess of Eusebius over Africanus to three years (25–22); but then Africanus gives the third reign as twenty-four years to Eusebius's twenty-one years, which equalizes the two lists down to the reign of Misaphris. Misaphris, according to Africanus, reigned thirteen years, and according to Eusebius twelve. The remainder of the reigns agree in both lists, with the result that the total of Africanus is one year more than Eusebius. The twenty-one *plus* years which Josephus's list exceeds the other two are the years of Amesses omitted by Eusebius, and which number Africanus omitted by leaving out Amos's twenty-five years and raising the third reign from twenty-one years to twenty-four. It is clear that as the comparison is between successive reigns in the lists, that the insertion of Amesses or Amersis in the lists of Africanus and Josephus must throw the remaining reigns one place lower in the comparison between these and that of Abydos. But these lists all agree at the end; hence it must be admitted that the copyists, if we follow the

table of Abydos, have omitted a reign in order to equalize the number. This appears to have been the reign of Amenhotep II., who succeeded Thutmes III., as the monuments abundantly testify. If this is the case, then the reigns of Amesses, Mephres, and Mephramuthosis of Josephus, and the corresponding ones of Africanus and Eusebius must stand for the two in the table of Abydos, Thutmes II. and Thutmes III. The three of Josephus reign sixty years, according to Africanus sixty-one years, and the two of Eusebius only thirty-eight years. According to the hypothesis I am advocating, Thutmes III. claimed all these years as his own, but the total of Josephus is six years more than fifty-four, and that of Africanus is seven years more. The difference between Josephus and Africanus is caused by the way the months are added as years in the second set of years. I have given Amesses twenty-one to Africanus's twenty-two years. In the table which I have given of Thutmes III.'s reign, Hatasou is made to reign fifteen years after Thutmes II., not counting her first year, which overlapped the last year of that king. If in the list of Josephus we insert, in the place of the twenty-one years given to Amesses, the fifteen years of Hatasou, the total of the three will be fifty-four years (15 + 13 + 26). This I take to be the nearest approach which can be made from these lists to the fifty-four years in which Thutmes III. reigned. It is clear they are, as they stand in the copyists, inconsistent with the monuments, both as to the personality of the sovereigns and the years of Thutmes III.

IV. On the walls of the temple at Karnak are chiselled the records of the campaigns and victories of Thutmes III. I propose to make use of certain of these to confirm the date of the winter solstice in his reign, or rather to show that there is a perfect consistency between the dates belonging to his campaigns and the seasons of the year which are described in connection with them, and the date of the winter solstice already determined.

In the twenty-second year, in the month of Pharmuthi, the king was in the fortress of Zalu on his first campaign.

In the year 23, 4th of Pachons, the day of his accession to the throne, the king was in Gaza. The king left Gaza on the next day, the 5th of Pachons.

In the year 23, 16th of Pachons, at Ihem, a council of war was held, and Thutmes informs his followers that the King of Kadesh and his allies were in the town of Makitha awaiting their approach in order to give them battle. They decided in this council that the most advantageous approach to Makitha was by the road of Aluna.

In the year 23, on the 19th of Pachons, three days after the council of war, the king's tent was pitched at Aluna. The next day the Egyptian army arrived on the field of battle, pitched their tents, and prepared for the contest.

"In the year 21, on the 21st of Pachons, on the feast of the new moon, which is the anniversary of the coronation of the king, in the early morning, it was ordered to all the warriors that they should open."* The battle was fought on this day, resulting in the victory of Thutmes III. In the last date quoted, "in the year 21, on the 21st of Pachons," the 21st of Pachons is connected with the other dates of this month. The change from year 23 to year 21, if there is no error in the print, must be explained by another and different reckoning of years. Dr. S. Birch translates this date, ". . . . Moreover, on the 22d day of the month Mesori." But Dr. Brugsch's translation is in accordance with the proper season of the year; that of Dr. Birch puts the date three months later, at or about the summer solstice, at which time Palestine is burned and parched by the intense heat of midsummer, and when only on the hills would there have been any harvest for the king's troops to gather. In the catalogue of booty obtained after this battle is the following:

"Account of the harvest which the king reaped from the fields of the town of Megiddo: 280,000 (*xx*) measures of corn, besides that which was destroyed in gathering it in by the soldiers of the king."† With the winter solstice on the 30th of Mechir, earlier or later as the case may be, within the limits of Thutmes's reign, the vernal equinox will be on the 29th of Pachons, earlier or later, according to circumstances. The

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. pp. 320–324. Eng. trans.

† Ibid., p. 327.

battle took place on the 21st of Pachons, at or near the vernal equinox, which is the beginning of harvest in Palestine. Climate and the season of the year were taken into account as affecting the proper time to engage in a campaign. Such a custom is noticed in the Bible. "And it came to pass, after the year was expired, at the time when kings go forth to battle" (2d Samuel, xi. 1). These times will be regulated by the locality of the campaign, its object, etc. Active operations in some cases will be suspended, because it is necessary for the army to go into winter-quarters. The matter of forage for the horses and cattle must be thought of. As most of the expeditions in ancient times were for the purpose of collecting tribute or plunder, the campaign is so timed as to find the vanquished people well supplied with the means necessary to satisfy the wants of the conquerors. Other inscriptions of this king are to the same effect. One of the year 29 is as follows:

"Then went the king through the whole land of Zahi.

"Their trees were full of fruit, and their wine was found stored in cellars as well as in skins. Their wheat lay on the floor ready to be threshed. It was more than the sand of the sea-shore. The soldiers took possession of all these things."*

For Palestine the best time for a foray of this kind would be from the vernal equinox to the middle of May.

For expeditions to the south into Nubia the winter from November to February will be the most suitable. This in the time of Thutmes III. will include Mechir, Phamenoth, and Pharmuthi. A well-known inscription of this records the defeat of the mountaineers of Nubia on the 21st of Pharmuthi.

The following campaigns of Egyptian kings show that in a general way they kept pace with the advance of the tropical year in the vague. These kings all reigned after Thutmes III. in the order given, but the last two are separated from Thutmes III. and his successor by over two hundred years.

It will be found that expeditions into Palestine which are made in the time of the first two kings in the month Pachons occur in the time of Rameses II. in the month Epiphi. The

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 330. Eng. trans.

vernal equinox has left Pachons, passed through Payni, and is then in the month Epiphi. If we put the advance at about two months, the interval is about two hundred and forty years, which agrees generally with the number of years between these two sets of kings.

Thutmes III.—First campaign against Upper Ruthen (Palestine). Date, year 23, 21st of Pachons, the battle of Megiddo.

Amenhotep II., the successor of Thutmes III.—First campaign against Upper Ruthen. Dates of capture of towns: (1) 26th of Pachons; (2) 10th of Payni; (3) 20th of Payni.

Rameses II.—Second campaign in land of Zahi (Palestine). Date, year 5, and 9th of Epiphi.*

Mineptah, successor to Rameses II.—Battle of Prosopis (victory over the Lybians in the western part of the Delta). Date, year 5, 3d of Epiphi.

Regarding the date "year 21" of the battle of Megiddo, Dr. Brugsch, in writing of the same in other places, uses the year 23. The connection shows that the year 23 is right.

Turning to the table I have made of the reign of Thutmes III., it will be found that the year 23 of the jubilee of the vernal equinox falls in the year B.C. 1315. In this year the 1st of Thoth falls on the 15th of July, and the 21st of Pachons on the 1st of April, which was also the day of the new moon. This is certainly to the point; year 23 has new moon on the 21st of Pachons, which corresponded to the 1st of April, B.C. 1315. This is the date of the battle of Megiddo, fought, according to the inscription, on the day of the feast of the new moon and the 21st of Pachons.

Further, what is also remarkable is that in B.C. 1336 the new moon was on the 1st of Thoth equal to July 20, and counting from this point as an epoch, the 21st vague year began in B.C. 1316, and included the month of Pachons in B.C. 1315. Would it be rash to conclude from this that the battle of Megiddo was fought in the year 21, which was the current vague year of an Apis cycle, which began with the new moon on the 1st of Thoth, B.C. 1336, because from the character of the Egyptian vague, its

* "Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xiv. p. 50. Eng. trans.

commencement being at midnight, the lunar cycles connected with it should also have the same epoch, which will be when the moon rises at her third quarter? If the Apis cycle, instead of being commenced on the 1st of Thoth, began on the 1st of Phamenoth of the preceding vague year, with the moon at her third quarter, then the new moon will fall on the 9th of Phamenoth, and also on the 1st of the following vague year,—that is, the 1st of Thoth in B.C. 1336. The year 21 of such a cycle will end with Mechir, and the 21st of Pachons in year B.C. 1315, instead of falling in the twenty-first year, will fall in the twenty-second year of the Apis cycle. The twenty-second year, it will be remembered, began the account of this campaign. Dr. Brugsch writes as follows about this date: "Agreeing with this" (that is, the theory that the regnal years did not begin with the 1st of Thoth), "the great tablet of Victory of Karnak announces that the same king, in the twenty-second year of his reign, in the month Pharmuthi (the day of the month is unfortunately destroyed), left the Egyptian frontier to arrive at Gaza a few days later, in the twenty-third year, on the day of his coronation, the 4th of Pachons. Here there can be neither a wrong reading nor error."*

Dr. Brugsch's idea is that Thutmes III.'s first regnal year began on the 4th of Pachons; all his years are reckoned from this date, hence all dates before the 4th of Pachons fall in a previous year. This does not contradict; but as all these dates fell in the same vague year, I have only suggested a certain mode of counting these years by which the date of the battle of Megiddo fell in a twenty-second or twenty-first year. This date —the 4th of Pachons—of his accession to the throne, compared with the one we have just been considering, which had the new moon on the 21st of Pachons, "which is the anniversary of the coronation of the king," has suggested to me the conjecture that the 4th of Pachons was also a day of the new moon.

I find in B.C. 1319 the new moon was on the 4th of Pachons, concurring with March 16. By reference to the table of the reign of Thutmes III. it will be found that the fourteenth year

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 315. Eng. trans.

of Hatasou, which in this instance I have reckoned from 1st of Thoth, fell in with B.C. 1320 and 1319. The following year is the one in which Thutmes III.'s first exercise of kingly power bears date the 27th of the month Pachons of the fifteenth year. The conclusion is that Thutmes III.'s coronation was on the 4th of Pachons, B.C. 1319, concurring with March 16, and day of new moon. This was in the fourteenth year of Hatasou, reckoning her years from the 1st of Thoth, or the fifteenth year, reckoning from between Mechir and Pachons, and at the most but a few days over a year from the earliest known date of Thutmes III.'s assumption of power.

The following are the dates established in the reign of Thutmes III.:

B.C. 1341.—The first year of his assumed reign.

B.C. 1319.—His accession to the throne on the 4th of Pachons, concurrent with the 16th of March.

B.C. 1318.—The heliacal rise of Sirius on the 1st of Thoth, concurrent with July 16.

B.C. 1315.—The battle of Makitha (Megiddo) fought on the 21st of Pachons, which concurred with April 1.

B.C. 1288.—The foundation of a temple at Thebes on the day of the winter solstice, Mechir 30, concurrent with January 3.

B.C. 1287.—His death on the 30th of Phamenoth, which coincided with February 2, just one year and thirty days after the laying of the foundation-stone of the temple at Thebes.

CHAPTER VII.

ESTIMATED EPOCHS OF KINGS PRECEDING THUTMES III. IN THE EIGHTEENTH DYNASTY.

THE epochs of kings of the eighteenth dynasty, reigning before Thutmes III., are estimated from the life of Pen Nukheb. An inscription in the tomb of the warrior contains the following: "My early life passed in the time of the defunct King Aahmes, and of the defunct King Amenhotep I., and the defunct King Thutmes I., and the defunct King Thutmes II., and was

finished in the time of Thutmes III. May he live long."* We have here the case of a man who lived to "a fortunate old age," and who was probably born before the reign of King Aahmes, and who finished his life in the reign of Thutmes III. Pen Nukheb also tells us, "[I served] King Aahmes in a hand-to-hand combat. I gained for him in the land of Zahi ten hands." Pen Nukheb must have been old enough in the reign of Aahmes to take part in a foreign war. Aahmes, according to the copyists of Manetho, reigned twenty-five years. His twenty-second year is found on the monuments, therefore twenty-five years for the length of his reign is retained. I estimate the age of Pen Nukheb to have been about thirty years when Amenhotep ascended the throne, and allowing fifteen years to each of the following reigns, the result is:

Age of Pen Nukheb at the beginning of the reign of Amenhotep	0–30	years.
His age at the beginning of the reign of Thutmes I.	15–45	"
" " " " Thutmes II.	30–60	"
" " " " Thutmes III.	45–75	"
Duration of his life in the reign of Thutmes III. (15)	60–90	"

From this may be estimated the epochs of the following kings, calculating them from the epoch of Thutmes III., formerly obtained B.C. 1341:

Aahmes, B.C. 1396 (25 years).
Amenhotep, " 1371 (15 ").
Thutmes I., " 1356 (15 ").

CHAPTER VIII.

ESTIMATE OF THE PERIOD BETWEEN THUTMES III. AND RAMESES II.

THE epoch of Amenhotep II., the successor of Thutmes III., is fixed by that of the latter king. It was in B.C. 1287. In estimating the epochs of the kings of the table of Abydos for

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. xiii. p. 274. Eng. trans.

the period between Thutmes III. and Rameses II., the epoch of Thutmes III., already established, B.C. 1341, is taken as the starting-point, and all the reigns are reckoned at forty years each. This will give Amenhotep II. an estimated epoch fourteen years higher than his true one, because Thutmes III. reigned fifty-four years. The arrangement of the table of Abydos served some chronological purpose, and the number of kings selected (supposing each king represented the same number of years) depended upon the period covered by the table. If the list was complete for all the kings, the average for each king will be the years of the period divided by the number of kings. If the average was a round number, it determines the number of selected kings. Dr. Brugsch adopts for the table of Abydos the generation of thirty-three and one-third years. He interpolates between the eighteenth and twelfth dynasties five hundred and sixty-six years, during which sixteen generations of Hycsos kings reign; he counts the reigns of Thutmes II. and Thutmes III. as one generation, and inserts one generation of heretic kings between the eighteenth and nineteenth dynasties. He thus obtains three thousand one hundred years for the kings of this table. If he had allowed the average of forty years to each king, he would have obtained nearly the same result without recourse to interpolations, three thousand and eighty years. The period of three thousand and eighty years is based upon the sidereal year, and came to an end in the reign of Rameses II. Some heliacal rising of Sirius probably closed the period. This I suspect to be the opinion of Dr. Brugsch, because he estimates the epoch of Rameses II. at B.C. 1333, and it is well known that the epoch of the Sothic cycle is usually put at B.C. 1322. If the period of three thousand and eighty years ends in B.C. 1322, it began in B.C. 4401, and Dr. Brugsch places the epoch of Mena, the first king, in B.C. 4400, using the table of Abydos with the changes already noticed, counting three generations to the century.

Epochs Estimated by the Average of Forty Years.

70 B.C.	1341, Thutmes III. . . .	0	74 B.C.	1181, Horemhib . . .	160
71 "	1301, Amenhotep II. . .	40	75 "	1141, Ramessu I. . . .	200
72 "	1261, Thutmes IV. . . .	80	76 "	1101, Seti I.	240
73 "	1221, Amenhotep III. .	120	77 "	1061, Ramessu II. . .	280

The average is, of course, artificial, but the period is not so. The basis upon which the artificial system was raised is presumably sound. Uncertainty affects the intermediate reigns, but not materially those at the extremes. It will be proven that Rameses II. began his reign in B.C. 1057, only four years later than the epoch produced for him by the above reckoning for the table of Abydos. Again, if the interval between B.C. 1319, the year in which Thutmes III. was crowned, and B.C. 999, in which year fell the fifty-ninth year of Rameses II., which is three hundred and twenty years, be divided among eight kings of the table of Abydos, beginning with Thutmes III. and ending with Rameses II., we will have eight periods of forty years.

CHAPTER IX.

RAMESES II. AND THE ERA OF KING NUB.

THE following table of the reign of Rameses II. is given to show the place of the four hundredth year of the era of King Nub. The thirty years' jubilee connected with the vernal equinox begins in Rameses II.'s fortieth year. It and the other jubilees of the thirtieth, thirty-fourth, and thirty-seventh years are designated. The one of the fortieth year is the key to the whole arrangement, and the one for which the hypothesis was advanced that it coincurred in part with the four hundredth year of King Nub, mentioned on the memorial-stone which was raised in the reign of Rameses II., and which bore the date Mesori 4. In the table I have given Rameses II. sixty-seven years, because his sixty-seventh year is found on the monuments. Adjusting this reign with the fortieth year at B.C. 1018, and extending the Julian years upward, we get B.C. 1057 for the first year of Rameses II.'s reign.

	Jubilee Cycles.				Regnal Years.	Year of the Era of King Nub.
B.C.	S. S.	A. E.	W. S.	V. E.		
1057	1	26	23	20	1	361
1056	2	27	24	21	2	362
1055	3	28	25	22	3	363
1054	4	29	26	23	4	364
1053	5	1	27	24	5	365

B.C.	Jubilee Cycles. S. S.	A. E.	W. S.	V. E.	Regnal Years.		Year of the Era of King Nub.
1052	6	2	28	25	6		366
1051	7	3	29	26	7		367
1050	8	4	1	27	8		368
1049	9	5	2	28	9		369
1048	10	6	3	29	10		370
1047	11	7	4	1	11		371
1046	12	8	5	2	12		372
1045	13	9	6	3	13		373
1044	14	10	7	4	14		374
1043	15	11	8	5	15		375
1042	16	12	9	6	16		376
1041	17	13	10	7	17		377
1040	18	14	11	8	18		378
1039	19	15	12	9	19		379
1038	20	16	13	10	20		380
1037	21	17	14	11	21		381
1036	22	18	15	12	22		382
1035	23	19	16	13	23		383
1034	24	20	17	14	24		384
1033	25	21	18	15	25		385
1032	26	22	19	16	26		386
1031	27	23	20	17	27		387
1030	28	24	21	18	28		388
1029	29	25	22	19	29		389
1028	**1**	26	23	20	**30**	Jubilee of the thirtieth	390
1027	2	27	24	21	31	year.	391
1026	3	28	25	22	32		392
1025	4	29	26	23	33		393
1024	5	**1**	27	24	**34**	Jubilee of the thirty-fourth	394
1023	6	2	28	25	35	year.	395
1022	7	3	29	26	36		396
1021	8	4	**1**	27	37	Jubilee of the thirty-	397
1020	9	5	2	28	38	seventh year.	398
1019	10	6	3	29	39		399
1018	11	7	4	**1**	40	Jubilee of the fortieth year;	400
1017	12	8	5	2	41	also the year of the rais-	401
1016	13	9	6	3	42	ing of the memorial of	402
1015	14	10	7	4	43	King Nub, or the four	403
1014	15	11	8	5	44	hundredth year of the era	404
1013	16	12	9	6	45	of that king began in this	405
1012	17	13	10	7	46	year.	406
1011	18	14	11	8	47		407
1010	19	15	12	9	48		408

B.C.	Jubilee Cycles. S. S.	A. E.	W. S.	V. E.	Regnal Years.		Year of the Era of King Nub.
1009	20	16	13	10	49		409
1008	21	17	14	11	50		410
1007	22	18	15	12	51		411
1006	23	19	16	13	52		412
1005	24	20	17	14	53		413
1004	25	21	18	15	54		414
1003	26	22	19	16	55		415
1002	27	23	20	17	56		416
1001	28	24	21	18	57		417
1000	29	25	22	19	58		418
999	**1**	26	23	20	59	The heliacal rising of	419
998	2	27	24	21	60	Sirius, year 1, 23d of	420
997	3	28	25	22	61	Athyr, concurrent with	421
996	4	29	26	23	62	B.C. 999 and July 18.	422
995	5	**1**	27	24	63	.	423
994	6	2	28	25	64		424
993	7	3	29	26	65	.	425
992	8	4	**1**	27	66		426
991	9	5	2	28	67		427

The beginning of the era of King Nub I place at the vernal equinox of B.C. 1417. This will cause the four hundredth year to commence in B.C. 1018. I begin it at the vernal equinox, because I found that the memorial-stone of King Nub is dated on the 4th of Mesori of the four hundredth year of this king. The 4th of Mesori was at the vernal equinox in B.C. 1018. On the hypothesis that this was the fortieth year of Rameses II., I was enabled to adjust the remaining jubilees of Rameses II., and to form a table of the same, and to extend it to the reign of Thutmes III.

In this year, B.C. 1417, the rising of Sirius took place on the 15th of July, concurrent with the 11th of Mesori, which was also the day of the new moon.

We meet here a peculiarity of the sidereal year not before noticed, and which goes to explain the origin of the calculation of the rising of Sothis by the one hundredth year of the era.* It is this: if in B.C. 1417 the rising took place on

* Censorinus, writing A.D. 238, says, "For a hundred years ago from the present year of the Consulships of Ulpius and Brutius the same fell upon the 12th Kalends of August (21st of July), on which day Canicular

July 15, the day of the new moon, then in B.C. 1318, in the one hundredth year thereafter, this rising will take place on July 16, and the day of the full moon.

The explanation of this is that ninety-nine Julian years are, on an average, a little over ten hours shorter than twelve hundred and twenty-four and one-half synods of the moon. If, as above stated, the rising was on the 15th of July, then, as after ninety-nine years the full moon will be on the 16th of July, this will be the second day of the one hundredth year, and by the technical rule of this cycle the day of the rising. The advance of the sidereal year in the Julian for ninety-nine years has an average of over fifteen hours, or about five hours more than that of the above-described lunar period. This doctrine of the one hundredth year cannot be used continuously in the cycle from the same era, because the period is measured by terms of ninety-nine years, but in every instance the star will rise in the one hundredth year, counting from the date of its rising in a year 1 of a preceding term of ninety-nine years.

The following epochs are separated one from the other by terms of ninety-nine years. They show the advance of the new and full moons of the lunar period in the Julian year, indicating the technical rising required by the cycle:

B.C.	1417	H.	rising	July	15,	and day of new moon.
"	1318	"	"	"	16,	" full moon.
"	1219	"	"	"	16,	" new moon.
"	1120	"	"	"	16,	" full moon.
"	1021	"	"	"	16,	" new moon.
"	922	"	"	"	17,	" full moon.
"	823	"	"	"	18,	" new moon.
"	724	"	"	"	18,	" full moon.
"	625	"	"	"	18,	" new moon.
"	526	"	"	"	19,	" full moon.
"	427	"	"	"	20,	" new moon.

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regularly rises in Egypt." This is the same date as that for which the authority of Meton is given as being twenty-eight days after the summer solstice of A.D. 138. Geminus, writing in this year (A.D. 238), says, "The present year is the hundredth year of the solar or Canicular year;" but he gives July 20, in place of July 21, for the date of the heliacal rising.

B.C.	328	H.	rising	July	20,	and day of	full moon.
"	229	"	"	"	20,	"	new moon.
"	130	"	"	"	21,	"	full moon.
"	31	"	"	"	21,	"	new moon.
A.D.	69	"	"	"	22,	"	full moon.
"	168	"	"	"	22,	"	new moon.

If we understand that the technical risings of the cycle were confined to these dates throughout this great period, we can, perhaps, explain the origin of the date July 20, which has been connected with the rising of Sirius.

By the decree of Canopus we know that Sirius rose heliacally in Egypt in B.C. 238. At this time, by the foregoing table, and the cycle of twelve hundred and twenty-four and one-half synods of the moon, Sirius rose on the 20th of July. But it must be kept in mind that Sirius rises heliacally every year, and that during these periods in which the star rose on the 20th of July, that only of those dates which, by the cycle of nineteen years, will have the new and full moon return to them can the coincidence of the new and full moon and the given date of the Julian be predicated for the rising of the star. There is nothing in this view of the sidereal cycle to contradict what has been advocated in the chapter particularly given to this subject. This is an entirely different cycle. The period of fourteen hundred and sixty years does not enter into it without breaking the series of ninety-nine years of which it is composed. We discover by it that if the rise of Sirius is confined to July 20, it does not always have the new or full moon on that date at its rising, and this may account for the statement of Censorinus that the moon was not taken into account. But the moon was taken into account in order to produce a selection of the date July 20. If July 20 was adopted as the proper date of the heliacal rising in A.D. 138, for the reason that by this cycle this was its date in B.C. 238, it was done manifestly through ignorance of how the date July 20, in the first instance, was obtained.

If a Sothic cycle began July 15, B.C. 1417, then the rising in B.C. 1318, on July 16, was of the one hundredth year. Again, this cycle of the era B.C. 1417 came to an end in A.D. 44, and a second cycle began, the era of which was A.D. 44. The cycle which began in B.C. 1318 came to an end in A.D. 143, with the

full moon on the 15th of July, and this was the one hundredth of the era of the cycle which began in A.D. 44, with new moon on the 14th of July. The cycle which began in A.D. 143, with full moon on the 15th of July, had for the beginning of its one hundredth year the 15th of July, A.D. 242, in which year the new moon was on the 15th of July.

The Heliacal Rising of Sirius in this Reign.—A long inscription of Rameses II. informs us, "On one of these days, it was in the first year, on the 23d day of the month Athyr, on [his return home] after (the conclusion) of the feast of the voyage of Amon to Thebes, then he went out, endowed with power and strength by Amon and by Tum, out of the city of Thebes. They had assured him a recompense through never-ending years, as long as the duration of the existence of the sun in heaven.

"He raised his hand, which bore the incense-vessel, upwards to the heavenly orb of light of the living God. The sacrificial gifts were splendid, they were received with satisfaction in all his . . . (?) The king (now) returned from the capital of the land of the South. [As soon as] the sun [had risen] the journey commenced." The inscription further tells us that the king visited the Necropolis of Abydos and found the temple of his father Seti unfinished. After giving directions for its completion and the repairing of that which had fallen down, the king makes a song of praise to his father Seti: "Awake, raise thy face to heaven, behold the sun, my father Mineptah, thou who art like God. Here am I who make thy name to live. . . . Thou restest in the deep like Osiris, while I rule like Ra among men (and possess) the great throne of Tum, like Horus, the son of Isis, the guardian of his father. Beautiful is that which I have done for thee. Thou enterest on a second existence." . . . The portion to which attention is more particularly directed is in these words: "Thou hast entered into the realm of heaven. Thou accompanyest the sun-god Ra. Thou art united with the stars, and the moon. Thou restest in the deep, like those who dwell in it with Unnofer, the eternal. Thy hands move the god Tum in heaven and on earth, like the wandering stars, and the fixed stars. Thou remainest in the forepart of the bark of millions. When the sun rises in the tabernacle of heaven, thine eyes behold his splendor. When Tum (the evening sun) goes

to rest on the earth, thou art in his train. Thou enterest the secret house before his lord. Thy foot wanders in the deep. Thou remainest in the company of the gods of the under world."* The king is here speaking in figurative language, which has a new meaning if we recognize in it allusions to the heliacal rising of Sirius, which happened on this day.

Sothis rose B.C. 1318 on the 1st of Thoth. In B.C. 999 the precession of the star for three hundred and nineteen years will be eighty-one days, six hours *plus;* this will bring the rising to the 23d day of the month Athyr, the date mentioned in the inscription, when, after he had "raised his hand, which bore the incense-vessel, upwards to the heavenly orb of light of the living God," he returned from Thebes and commenced his journey as soon as the sun rose. The meaning of the year 1 of the inscription is found by reference to the table of the reign of Rameses II., where opposite to the year B.C. 999, Rameses's fifty-ninth year, is found year 1 of the cycle of the jubilee of the summer solstice. This explanation of the year 1 is necessary in order to avoid the difficulty which arises if this year is understood to have been the first year of Rameses's reign, for the inscription implies that Seti had been dead many years. In this year began the third cycle of the jubilee of the summer solstice in Rameses's reign, and the second celebration of the festival for this king. In B.C. 999, Sirius rose on the 18th of July, concurrent with the 23d of Athyr, and in the first year of the jubilee cycle, which began in this year at the summer solstice. This was also the day of the visible new moon following the summer solstice.

CHAPTER X.

THE PERIOD BETWEEN TAKELATH II. AND RAMESES II., AND THE CHRONOLOGY DOWN TO THE PERSIAN INVASION.

THE epoch of Takelath II. was in B.C. 846. The interval between Rameses II. and this king is about one hundred and

* "Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xiv. pp. 34–41. Eng. trans.

forty-five years. This will give about fourteen years to each ten kings. The priestly dynasty is not found in the copies of Manetho as a separate one. The last three kings of the twenty-first dynasty evidently belong to it.

Osochôr.	Hirhor. (Pehor.)
Psinaches. (Pinaches.)	Piankhi.
Psusennes. (Susennes.)	Pinotem I. or Pisebekham I.

If this dynasty is allowed a duration of forty or forty-five years, and the successors of Rameses II. fifty-seven years, the following epochs are obtained:

Epoch of twenty-first dynasty, B.C. 934.
Epoch of twenty-second dynasty, B.C. 889 or 894.

THE EPOCH OF TAKELATH II., B.C. 846.

There are two inscriptions, one of which mentions the rise of Sirius on the 1st of Tybi in an eleventh year, and the other, what is supposed to be a lunar eclipse, on the 25th of Mesori in a fifteenth year during the reign of Takelath II. If these can be used to confirm each other,—that is, if Sirius could rise on the 1st of Tybi in an eleventh year, and a fifteenth year have a full moon on the 25th of Mesori,—the epochs of these can be determined, provided it is known why the rise of Sirius on the 1st of Tybi is especially mentioned, and that there was an eclipse on the 25th of Mesori.

Von Gumpach ("Baby-Worlds") asserts that Sirius rose heliacally on the 1st of Tybi in B.C. 832, and he identifies this as the one of the eleventh year of Takelath II. But with the eleventh year at B.C. 832, Mesori of the fifteenth year will fall in B.C. 827, in which year a lunar eclipse was impossible on the 25th of Mesori. Von Gumpach's endorsement of the epoch B.C. 832 is based upon a calculation which makes Sirius rise heliacally in that year on the 1st of Tybi. But what confidence can be placed in a calculation of this kind? Sirius rose on the 2d of Tybi in this year four minutes earlier than on the previous day. Now, it is known that at or about the summer solstice in Egypt, when the Nile overflows and covers the land, morning and evening mists prevail, owing to the great evaporation caused by the flood of waters. This is the condition prevailing at the time

Sirius rose in B.C. 832, and it is manifest that, as the rising of Sirius was an observed one, the conditions of an observable heliacal rising are different at different seasons in Egypt, which is a country of unusually clear atmosphere at other times. If the rising on the 1st of Tybi before sunrise was the first observed appearance of Sirius after the star had passed from the obscuration of the sun, with the atmosphere rendered opaque by mists, the star must be farther from the sun to be visible than when the medium through which it is seen is more transparent. Certainly a difference of one day in date and four minutes in time in the rise of the star are possible under the circumstances; therefore the determination by modern astronomers of the time of the heliacal rising of Sirius in Egypt in B.C. 832, or any other year, be they ever so accurate, is not conclusive as to the time of the actual observation intended by an inscription. Mr. Cooper, whom Von Gumpach cites in respect to this rising of Sirius, says, "The inscription is not positively known to connect the 1st of Tybi with the heliacal rising" (*Athenæum*, May 11, 1861). In connection with the Sothic cycle, I have shown that Sirius rose in B.C. 1318 on the 1st of Thoth (July 16), and day of the full moon; the second season of the great year began in B.C. 778, on the 16th of Tybi (July 16), and day of the full moon; and the third season began in B.C. 238, on the 1st of Payni (July 16), and day of the full moon. To show the correctness of the calculation of Von Gumpach, between B.C. 778 and B.C. 832 are fifty-four years, or an advance of thirteen days, twenty hours for the star, which will bring it relatively to the 15th of Tybi; and as the date 16th of Tybi was only chosen because it was the day of the full moon, the two calculations are harmonious. To have any uniform rule for determining the date of the rising of Sirius, the star must be seen, or known to be in a place where it could be seen if the atmospheric conditions were ordinarily favorable, and that rising was chosen which was first marked by the moon following the summer solstice. This must have been the case, or the risings would be like those of every year, which they evidently were not. There are scattered notices of such risings on different dates of the vague year, and in every instance, if my position is correct, they were observed in connection with the new or full moon following

the summer solstice. The rising in B.C. 832 on the 1st of Tybi was without either the new or the full moon on that date, and is valueless by itself to determine the epoch of Takelath II.

When we come to consider the eclipse of the moon in the fifteenth year of this king many difficulties are met, caused by the condition of the inscription and the inaccuracy of some of the copies which have been made of it. Dr. Brugsch ("Egypt under the Pharaohs," vol. ii. pp. 217, 218, Eng. trans.) gives the following account of it: Usarkon, the eldest son of Takelath II., was the high-priest of the Theban Amon, the commander-in-chief of the army, and also a petty king. He is the Usarkon of whom so much is related on a memorial-tablet in the interior of the Hall of the Bubastids. The account begins with the 9th of Thoth, in the twelfth year of his father (Takelath II.).

At this time Usarkon went to Thebes in his character of high-priest. The continuity of the record is broken in several places by lacunæ. In spite of the damaged condition of the inscription, the purpose of his presence in Thebes can be made out. Further on is related the following event of the fifteenth year.

"When now had arrived the fifteenth year, the month Mesori, the 25th day, under the reign of his father, the lordly Horus, the godlike prince of Thebes, *the heaven could not be distinguished, the moon was eclipsed* (literally, *was horrible*), for a sign of the (coming) events in this land; as it also happened, for enemies (*literally*, the children of revolt) invaded with war the southern and northern districts (of Egypt)."

Dr. Brugsch remarks upon this, "The eclipse of the moon, which is mentioned in the discourse as a warning of the coming events, I still continue to maintain, notwithstanding all the objections of M. Chabas. So long as no better-founded objection is brought against it than such as have been hitherto urged, it must surely be accepted as a fact, that on the 25th of Mesori, in the fifteenth year of the reign of Takelath II., a total eclipse of the moon took place in Egypt." The authority of Dr. Brugsch, in the matter of exactness and correctness, is very great. He says he has several times confirmed the statement from the monument itself, and his testimony is sufficient to decide in favor of the date 25th of Mesori. The ground is taken that an ordinary eclipse of the moon is described. This is not

necessarily the case, nor is the chronological value of the inscription altogether destroyed if assent is given to an opposite view. The moon could be under a shadow, but from a different cause than that of an eclipse. May not the expressions "the moon was struggling," or "the moon was horrible," literally describe the appearance of the moon which could be caused in some unknown, but not impossible, way? The expressions "the heaven could not be distinguished," or was "invisible," may describe accurately the fact that the stars could not be seen, and that no euphuism is intended here respecting the deprivation of the moon of her light. The fact is, the heaven is more visible—meaning by that the starry vault—on the occasion of an eclipse than when the full moon is unobscured. Still, the prodigy is spoken of just as an eclipse would be, and the fact that it was taken as an omen points also in the same direction, for eclipses were looked upon as signs of good and evil fortune. If we suppose that this event took place on the day of the full moon, and the effect was similar to that of an eclipse, with the addition of the total obscuration of the heavens, we find good reasons why it was supposed to be an omen of evil, and presaging coming troubles to the land. In A.D. 1678, January 12, there was a strange darkness at noonday. All physical phenomena of this character are looked upon by the ignorant and superstitious as ominous of evil. Without knowledge there is always fear, and it is only by faith born of experience that men are able to withstand the horror that is ever at hand to seize them. For the superstition about eclipses it is not necessary to go to antiquity, nor to semi-civilized and savage peoples of the present day; we have only to recall the account of the eclipse of A.D. 1654, when multitudes of people shut themselves up in cellars. But eclipses were not always regarded as omens of evil. An inscription, which may be found translated in the "Records of the Past," vol. iii., of the Annals of Assur-Nasir-Pal (Sardanapalus), contains the following:

> 44. "(And) in my first campaign when the Sun-god, guider of the lands, threw over me his beneficent protection."

An appended note as to the meaning of "protection" is, "or

shade. This may refer to the eclipse of the 13th of July, B.C. 885." Pianki, in his inscription, which will be often quoted later on in this work, in addressing Nimrod, king of Hermopolis Magna, exclaims, "Hast thou forgotten that the shadow of a god rests upon me." From Assyrian astronomical tablets ("Records of the Past," vol. i.) may be learned to what refinement the superstition was carried. One of these is as follows:

Tablet XII.

15. "In the month of Sivan (on) the 14th day an eclipse happens; and in the east it begins, and in the west it ends.
16. In the night watch it begins, and in the morning watch it ends. Eastward at the time of appearance and cessation its
17. shadow is seen; and to the King of Dibman the crown is given. The King of Dibman on the throne grows old."

Notice how particularly an eclipse of the moon is described; if no mention had been made of the night it would be known as a lunar eclipse, because it came on from the east.

18. "(On) the 15th day an eclipse takes place. The King of Dibman on the throne is slain; and a nobody seizes the throne."

The inscription continues with eclipses for the 16th, 20th, and 21st days, which are all unfavorable. The same tablet contains a description of a solar eclipse:

23. "In the month of Tammuz (on) the 14th day an eclipse happens; and in the west it begins and in the south and north it ends.
24. In the evening watch it begins, and in the night watch it ends. Westward at the time of appearance (and) disappearance
25. its shadow is seen; and to the King of Gutium a crown is given. . . ."

Here is described an eclipse of the sun on the 14th of the month, which is also a favorable omen, and this is followed, in portions not quoted, by eclipses on the 15th, 16th, 20th, and 21st days, which are unfavorable. Other inscriptions about other months are to the same effect.

A digression, I hope, may be pardoned here. These months Sivan, Tammuz, etc., are commonly known as lunar months, which, according to the rule, should begin with the visible new moon on the 1st of the month, and yet eclipses of the sun and moon are spoken of as taking place for both kinds on the 14th, 15th, 16th, 20th, and 21st of the month.

The measurement of the tropical year by lunar months is done by the aid of cycles which contain a period of full lunar months, and very nearly the same time as a number of full tropical years. While this is true of the cycle, each year shows a different state of things. The year is taken as of twelve lunar months of three hundred and fifty-four days, which are eleven days shorter than the common year, so from time to time a month of thirty days is added to overcome this shortage, and it happens that the luni-solar year varies in its excess of length from one to twenty-eight days. A luni-solar cycle may be constructed, differing not in principle, but in process, from the cycle of Meton, and which will permit of lunar dates upon other than the 1st and 14th days of the month.

We will suppose a cycle of eighty-four years subdivided into four smaller cycles, each of twenty-one years. The years are composed of twelve months, alternately of thirty and twenty-nine days, which at proper times are intercalated with a month of thirty days. The place of the tropical point, in respect to the moon at the beginning, will determine the years which are to be intercalated, because the luni-solar year is not to be excessively intercalated, nor allowed to fall behind the tropical year. We will suppose, for convenience of discovering the degree of exactness of the cycle, that it commences with the new moon at the vernal equinox. Twenty-one tropical years contain seven thousand six hundred and seventy days *plus*, and two hundred and sixty synods of the moon are seven days, twenty hours, *plus*, longer than that. Two hundred and sixty months are put in the calendar for each cycle, half of which are of thirty days and half of twenty-nine days. Eight of the months of thirty days are intercalary, and are added to the first, third, sixth, ninth, eleventh, fourteenth, seventeenth, and twentieth years of the cycle. This period of two hundred and sixty months is seven days and twenty-two hours, *plus*, shorter than

two hundred and sixty synodical months, and only two hours, *plus*, shorter than twenty-one tropical years; the consequence is that the new moon at the end of the cycle will have advanced from the 1st to the 8th of the month, while the tropical point will remain as at the 1st of the first month of the first year. This will bring the third quarter of the moon to the end of Cycle I. or beginning of Cycle II. Four of these cycles will begin at the vernal equinox: the first with the new moon, the second with the third quarter of the moon, the third with full moon, and the fourth with the second quarter. Four cycles of two hundred and sixty months contain ten hundred and forty months, which are one day and twenty-two hours, *plus*, shorter than ten hundred and thirty-nine synodical months, the latter having gained nearly two days over the former in that time, and the lunar dates travelled through the entire month. A series of these may be extended to great length by forming larger cycles of lesser ones.

4 cycles of	21	years equal	84	years.
4 "	84	"	336	"
4 "	336	"	1344	"

Four cycles of eighty-four years are seven days and seventeen hours, *plus*, shorter than four thousand one hundred and fifty-six lunations, which will require a new beginning for the next cycle by beginning one phase of the moon back; in other words, what happened to the cycle of twenty-one years in the period of eighty-four years now happens to that of eighty-four years in the period of three hundred and thirty-six years, and what will happen in the period of thirteen hundred and forty-four years, with cycles of three hundred and thirty-six years, will have the same character. The series need not be carried to this length, but a new one may be commenced after six hundred and eighty-seven years, which contain a number of full tropical years and full synodical months, with a difference of less than thirty minutes.

The following tables are for use with this cycle:

Table I.

This table contains corrections for the cycles. The correction for twenty-one years is eleven hours, thirty-seven minutes, and

eleven seconds. It is the difference between one-fourth of a lunation, seven days, nine hours, and eleven minutes, and the excess of two hundred and sixty synodical months, seven days, twenty hours, forty-eight minutes, and twelve seconds over twenty-one tropical years.

	D.	H.	M.	S.
Cycle I. of twenty-one years: correction	00	00	00	00
" II. " " "	00	11	37	11
" III. " " "	00	23	14	22
" IV. " " "	1	10	51	34

	D.	H.	M.	S.
Cycle I. of eighty-four years: correction	00	00	00	00
" II. " " "	1	22	28	45
" III. " " "	3	20	57	30
" IV. " " "	5	19	26	15

	D.	H.	M.	S.
Cycle I. of three hundred and thirty-six years: correction	00	00	00	00
" II. " " " "	00	8	43	59
" III. " " " "	00	17	27	58
" IV. " " " "	1	2	11	58

Table II.

This table is for a cycle of twenty-one years, beginning with any phase at the vernal equinox 0 d. 0 h. 0 m. The time opposite each year is that between the phase and the vernal equinox, the particular phase in all cases being the one at or next following this point.

Year.	D.	H.	M.	S.
1	00	00	00	00
2	18	15	43	51
3	7	18	43	39
4	26	10	27	30
5	15	13	27	18
6	4	16	27	6
7	23	8	10	57
8	12	11	10	45
9	1	14	10	33.
10	20	5	54	24
11	9	8	54	12
12	28	00	38	3
13	17	3	37	51

Year.	D.	H.	M.	S.
14	6	6	37	39
15	24	22	21	30
16	14	1	21	18
17	3	4	21	6
18	21	20	4	57
19	10	23	4	45
20	00	2	4	33
21	18	17	48	24

Table III.

This table gives the epochs of all the cycles, also the phase of the moon beginning each.

Each column of epochs, of which there are four, is divided into four cycles of eighty-four years, and each of the latter has four cycles of twenty-one years, and the whole period of thirteen hundred and forty-four years is divided into four cycles of three hundred and thirty-six years.

Cycles of 84 Years.	Cycles of 21 Years.	Cycles of Three Hundred and Thirty-six Years.							
		I.		II.		III.		IV.	
		B.C.		B.C.		B.C.		B.C.	
I.	1	1698	N.	1362	3 q.	1026	F.	690	2 q.
	2	1677	3 q.	1341	F.	1005	2 q.	669	N.
	3	1656	F.	1320	2 q.	984	N.	648	3 q.
	4	1635	2 q.	1299	N.	963	3 q.	627	F.
II.	1	1614	N.	1278	3 q.	942	F.	606	2 q.
	2	1593	3 q.	1257	F.	921	2 q.	585	N.
	3	1572	F.	1236	2 q.	900	N.	564	3 q.
	4	1551	2 q.	1215	N.	879	3 q.	543	F.
III.	1	1530	N.	1194	3 q.	858	F.	522	2 q.
	2	1509	3 q.	1173	F.	837	2 q.	501	N.
	3	1488	F.	1152	2 q.	816	N.	480	3 q.
	4	1467	2 q.	1131	N.	795	3 q.	459	F.
IV.	1	1446	N.	1110	3 q.	774	F.	438	2 q.
	2	1425	3 q.	1089	F.	753	2 q.	417	N.
	3	1404	F.	1068	2 q.	732	N.	396	3 q.
	4	1383	2 q.	1047	N.	711	3 q.	375	F.

To illustrate the workings of this method, take the year B.C. 851, in which there was an eclipse of the sun on March 2, from which we may infer there was a conjunction of the sun and moon on April 1 following.

In this year the vernal equinox was on March 29, the new moon being three days later. The year B.C. 851 (see Table III.) is in the first cycle of twenty-one years of the third cycle of eighty-four years of the third cycle of three hundred and thirty-six years; hence the corrections are:

	D.	H.	M.	S.
First cycle of twenty-one years	00	00	00	00
Third cycle of eighty-four years	3	20	57	30
Third cycle of three hundred and thirty-six years	00	17	27	58
	4	14	25	28

B.C. 851 is the eighth year of the cycle which began in B.C. 858, and the amount opposite year 8 in Table II. is to be added to the corrections to find the time the full moon falls after the vernal equinox in B.C. 851. This is the full moon, because in Table III. we find that the cycle which began in B.C. 858 began with full moon nominally at the vernal equinox.

	D.	H.	M.	S.
Corrections	4	14	25	28
Time for year 8	12	11	10	45
	17	1	36	13

The vernal equinox was on the 29th of March; this date, *plus* seventeen days, one hour, thirty-six minutes, thirteen seconds, and *minus* one-half a lunation, will give the time of new moon in reference to the vernal equinox.

	D.	H.	M.	S.	
March	29				
	17	1	36	13	
	46	1	36	13	
	31				
	15	1	36	13	
	14	18	22	1	
New moon	0	7	14	12	1st of April.

The new moon is on the 1st of April, as required. No allowance has been made for the hour and minute of the day April 5, B.C. 1698, of the time the sun was at the equinox, nor for the exact time of the conjunction of the sun and moon on that day. They have been taken as the same, which is not correct. If the tropical period between the vernal equinoxes of B.C. 1689 and B.C. 851 is scientifically followed, and the lunar period for the same, the result will vary slightly. The method is accurate enough to bring the new moon, in this instance, to the proper date, April 1.

The peculiarity of these cycles is, they begin successively one phase of the moon back of the phase which began a preceding one; hence the lunar months will follow a similar rule. If Nisan began in B.C. 1698 at the vernal equinox, Nisan in B.C. 1677 (see Table III.) will begin at the third quarter of the moon, and so on. The months, according to the cycle, will begin at different phases of the moon. If Nisan began at another phase in B.C. 1698, the phases for each cycle must be replaced by other proper ones. The columns of phases will be the same, but their order changed; that is, if Nisan began with the second quarter, the column which it heads, the last one, will change places with the first. The succession will be the same; that is, as if these columns were arranged in a circle about a centre, and revolving in one direction, any one may be chosen as the first, but the succession will be always the same. Whenever Nisan begins with a full moon, the new moon will be on the 14th of Nisan, and the new moon during the progress of this cycle of twenty-one years will move from the 14th to the 21st day, passing through the same dates as are mentioned in the inscriptions quoted. The explanation of this cycle is more complicated than the working of it. The only rule to be followed is the beginning of Nisan, *by a cycle of twenty-one years*, at the phase of the moon next following the vernal equinox. The four general epochs, from any one of which a series can be counted, are to be found in Table III., Cycle I., of eighty-four years, heading the four divisions of that cycle. I have produced this cycle to account for the week of dates found in these inscriptions, and to call attention to the resemblance of this week to the Jewish feast of

unleavened bread, which was kept as a memorial of their coming out of Egypt.*

But there is another cycle by means of which solar and lunar eclipses may be brought to these dates. If the one previously described was ever in use it was probably succeeded by the one now to be described, which in its turn was displaced by the luni-solar cycle of historic times. This is a cycle of six years. In this case the months are all of thirty days, there being twelve such in each year, and at the end of six of such years an intercalary month of thirty days was added, making every six years equal to that many Egyptian vague years. The months had the same names as those which have survived in the luni-solar year, Nisan, Tyar, Sivan, etc. The peculiarity of it was that it permitted another set of months, with the same names, to be current at the same time, the latter being strictly lunar months. The vague month of thirty days and the lunar month had the same new moon, which in one case fell on no fixed date, but wherever the new moon date happened, and in the other case the new moon began the month. The lunar month Nisan began either at the same time as the vague month Nisan, in which case the new moon will begin both months, or on the date of the new moon in the vague Nisan. Whenever there were two new moons in the vague Nisan there were two Nisans in the lunar year, and whenever there were two new moons in Adar of the vague year, the lunar year had a second Adar, called Ve Adar, and whenever the intercalary month at the end of the cycle was added, which was a vague Ve Adar, the lunar year also had a second Adar. As there can be only seventy-four new moons in six vague years, these are provided for in the vague year, two falling in each of some two months in every cycle of six years. The lunar year will follow the vague, and have a second month

* The five successive kings who reigned over Assyria and Babylonia, beginning with Sennacherib and ending with Nabopolassaros or Nabupalsar, are all furnished by Alexander Polyhistor with lengths of reigns cyclic in character. Sennacherib reigns eighteen years, a *saros;* Esarhaddon reigns eight years, an Octaëteris if a year like the Julian was known as early as B.C. 60; and Sammuegcs, Kinêladanos, and Nabupalsar each reign twenty-one years, the cyclic character of which has just been described.

of the same name whenever two new moons fall in the corresponding month of the vague year. This cycle may be adapted to the tropical year by reckoning its years from the new or full moon following the vernal equinox. Whenever the tropical point advances in the vague year, for example, a half of a lunation, which it will do in about sixty-one years, but sixty years will mark the period, because the cycle has an excess of lunar time, which will not be affected by taking it a year short, the vague year will receive a second Nisan. The inscriptions mention a second Nisan and a second Adar, and they also speak of the days and nights being "balanced,"—that is, "six hours of day and six hours of night" on the 6th and 15th of Nisan, which are understood to be dates of the vernal equinox.

The Assyrian Canon (George Smith), page 63, mentions an eclipse in the month Sivan, in the eponym of Esdusorabe, without giving the date, which was followed by a revolt in the city of Assur and other towns lasting four years. It may be conjectured from the unfavorable omens of eclipses on days between the 14th and 22d of the month that this eclipse fell within those dates. Prejudices are formed by misfortune and predilections by good fortune. The supreme civil power is made responsible for public weal or woe. Let once a superstition get hold upon a nation that eclipses occurring on certain days of certain months presage evil, because the gods are evilly disposed, and let this be accompanied by disaffection caused by tyranny and misrule, or other misfortune, and let there be bold and opportune leaders ripe for rebellion, either to save themselves from the jealousy of a monarch, or ambitious enough to dispossess him of his throne, and add to this the ability to recognize the right moment for a successful revolt, or one which promises the most success, and we have the reason why a superstition affecting certain days will be prolonged and strengthened by the circumstances which it itself has had a no mean part in creating. Take the eclipse predicted by Thales, which, according to Herodotus (Book i. 74), occurred in the sixth year during a battle between the Medes and Lydians, which caused both parties to cease from fighting and to form an alliance; or the eclipse mentioned by Xenophon (Anab. iii. 4, § 7) at the taking of Larissa by the Persians, which compelled the Medes

to retire, and brought about the capture of the city by the Persians.

In one case, as both parties were equally matched it produces the same effect upon both; in the other case the Persians are successful against the Medes, and granting that both parties were equally superstitious about the matter, the cause of the success of the Persians must be credited to the possession of qualities and powers, which would have given them the victory even if no eclipse had taken place, because the reaction is quicker; but the eclipse, being a factor in the struggle, the effect will, in the future, to the victors be an omen of good, and to the defeated an omen of evil. It appears the Persians drew favorable omens from solar eclipses, and the predilection is probably due in part to the fortunate issue of the battle of Larissa, which broke the power of the Medes and established the supremacy of the Persians. The effect and the interpretation of the eclipse at Sardis at the time of the departure of Xerxes in his expedition against the Greeks is described by Herodotus (Book vii. chap. xxxvii). "Day was thus turned into night; whereupon Xerxes, who saw and remarked the prodigy, was seized with alarm, and, sending at once for the Magians, inquired of them the meaning of the portent. They replied, 'God is foreshadowing to the Greeks the destruction of their cities; for the sun foretells for them and the moon for us.'" This must mean, as this is a solar eclipse described as presaging good to the Persians, that in a solar eclipse it is the moon that overcomes the sun, and hence foretells the triumph of the Persians.

Returning to the subject previously under discussion, I offer the following explanation of the two dates in the reign of Takelath II.

I find that in B.C. 835 the full moon was on the 1st of Tybi, concurrent with July 15 (adjustment of 1st of Thoth to February 23, B.C. 747). The rising of Sirius on this day fulfils all the conditions which have been laid down as technically necessary to such an event.

I find that in B.C. 842 the full moon was on the 25th of Mesori, concurrent with March 8, and this was in a fifteenth vague year reckoned from a first year which had the full moon on the 1st of Thoth, B.C. 857. This may be considered as another form of

the Apis cycle, or cycle of twenty-five years. The other form of this cycle, as previously set forth in this work, began with the conjunction of the sun and moon on the 1st of Thoth, and one such began in B.C. 850.

In connection with the cycle of twenty-five years, which began with the full moon of Thoth, B.C. 857, there was another of the fifteenth year, which may be styled the *Indication of the fifteenth year*, to distinguish it from the so-called cycle of Indiction.

In connection with the sidereal year there was a cycle of the twelfth year, which also may be called the *Indication of the twelfth year.*

The indication of the fifteenth year contained fourteen vague years, and the cycle is used to mark the falling back of the lunar dates one day; that is, if in year 1 the full moon was on the 1st and 30th of Thoth, falling twice in that month, in the fifteenth year it will fall on the 29th of Thoth.

The indication of the twelfth year was a cycle of eleven years, which is used to mark the advance of the lunar dates one day; that is, if full moon was on the 1st of Thoth in year 1, it will in year 12, which is the first year of the next cycle, fall on the 2d of Thoth.

The following table contains the two cycles of twenty-five years, and the two indications for the same period with their Julian epochs. It will be noticed that the eleventh year of the indication of the twelfth year corresponds with the vague year which began in B.C. 835, which had full moon on the 1st of Tybi, also that Mesori of the first year of the indication of the fifteenth year, which is the fifteenth year of the cycle of twenty-five years, which began with full moon on the 1st of Thoth, falls in B.C. 842, the year which has full moon on the 25th of Mesori, concurrent with March 8. The expression "fifteenth year" means the first year of a cycle of fourteen years, both extremes being counted according to ancient practice; that is, as if reckoning from an era.

B.C.	Cycle of B.C. 850. New Moon on 1st Thoth.	Cycle of B.C. 857. Full Moon on 1st Thoth.	Indication of the Fifteenth Year.	Indication of the Twelfth Year.
857	18–19	**25**– 1	**14**– 1	10–**11**
856	19–20	1– 2	1– 2	**11**– 1
855	20–21	2– 3	2– 3	1– 2
854	21–22	3– 4	3– 4	2– 3
853	22–23	4– 5	4– 5	3– 4
852	23–24	5– 6	5– 6	4– 5
851	**24–25**	6– 7	6– 7	5– 6
850	**25**– 1	7– 8	7– 8	6– 7
849	1– 2	8– 9	8– 9	7– 8
848	2– 3	9–10	9–10	8– 9
847	3– 4	10–11	10–11	9–10
846	4– 5	11–12	11–12	10–**11**
845	5– 6	12–13	12–13	**11**– 1
844	6– 7	13–14	13–**14**	1– 2
843	7– 8	14–15	**14**– 1	2– 3
842	8– 9	**15**–16	1– 2	3– 4
841	9–10	16–17	2– 3	4– 5
840	10–11	17–18	3– 4	5– 6
839	11–12	18–19	4– 5	6– 7
838	12–13	19–20	5– 6	7– 8
837	13–14	20–21	6– 7	8– 9
836	14–15	21–22	7– 8	9–10
835	15–16	22–23	8– 9	10–**11**
834	16–17	23–24	9–10	**11**– 1
833	17–18	**24–25**	10–11	1– 2
832	18–19	**25**– 1	11–12	2– 3

In this way the epochs of the two dates in the reign of Takelath II. may be obtained. The years given for those dates in the inscriptions are not regnal years in the sense that they denote the duration of his reign, but they are those of the cycles just described and exemplified. To show I am right in one particular is all that is necessary. I have shown in previous chapters that Sirius rose in B.C. 1318 on the 1st of Thoth, concurrent with July 16, the day of the full moon; also, that the star rose in the reign of Rameses II., B.C. 999, on the 23d of Athyr, concurrent with the 18th of July, the day of the visible new moon, and now that in B.C. 835 the full moon and the rise of Sirius were on the 1st of Tybi. Between B.C. 1318 and B.C. 999 are three hundred and nineteen years, or twenty-three cycles of eleven years; between B.C. 999 and B.C. 845, the first year of the cycle whose eleventh year fell in B.C. 835–834, are one hundred and fifty-four years, or exactly fourteen cycles of eleven years.

B.C. 1318 and B.C. 999 have each the first years of these cycles, that of B.C. 999 being so denominated in the inscription of Rameses II., which mentions the event, and that of B.C. 835 is in the eleventh year of the cycle, agreeing with the inscription which mentions the rise of Sirius in an eleventh year in the reign of Takelath II.

The cycle of eleven years is also found in the reckoning of the rise of Sirius by the one hundredth year; there being nine cycles in this period, the one hundredth year is the first year of a tenth cycle. These dates do not fix the epoch of Takelath's first year, but, as he was reigning in a twelfth year, before the fifteenth year mentioned, his epoch was not lower than B.C. 846, and this is the epoch I have given him.

The copy of Manetho by Africanus places Takelath II. sixty-one years after the epoch of the twenty-second dynasty, whose first king was Sesonshis, the Shishak of the Bible. The copy by Eusebius makes this period to be thirty-six years. There are three unnamed kings in Africanus, omitted by Eusebius, who reign twenty-five years. If the period is put at forty-eight years, which is a mean between the two, the epoch of the twenty-second dynasty and of Shishak, calculated from the epoch I have found for Takelath II., will be B.C. 894.

Between this and the twenty-sixth dynasty there is very little to go by outside of the conflicting copies of Manetho. With Tirhakah and Ammeres, his son (Rud-amon of the Egyptian inscription), we begin to get hold of something more definite. The regnal years of the twenty-sixth dynasty are determined from the Apis stêlæ discovered by Mariette Bey. The combined reigns of Tirhakah and Rud-amon I estimate at thirty years. This is obtained from Eusebius by deducting eight years from the combined reigns of Tirhakah and Ammeres, thirty-eight years. The eight years are those of Nechao I. (Africanus), who was a satrap under the Assyrians during the struggle between them and Tirhakah. According to Africanus, the period from the 1st of Tirhakah to the 1st of Psammeticus was thirty-nine years, which, less the reign of Nechao, gives thirty-one years. According to Eusebius this period was fifty-seven years, which, less the reign of Ammeres, eighteen years, gives thirty-nine years, and less Nechao's reign, eight more years, leaves

thirty-one years. The copies of Manetho have inserted three or four kings between Tirhakah and Psammeticus, but they must have reigned contemporaneously with Tirhakah and Ammeres, because an Apis stêla mentions the birth of an Apis bull in the twenty-sixth year of Tirhakah and his death in the twentieth year of Psamethik, and the longest estimate for his life should be twenty-five years, which will require thirty years for the two reigns of Tirhakah and his son, for the Apis must be four years old when Psamethik ascends the throne to allow for this.

B.C.	682, Tirhakah.		
"	652, Psamethik I.,	54 years.	
"	598, Necho,	16 "	
"	582, Psamethik II.,	5 "	
"	577, Hophra,	19 "	
"	558, Amasis,	44 "	
"	514, Psamethik III.,		6 months.

These epochs, except that of Tirhakah, which is eleven years lower, are fourteen years lower than those given by Dr. Brugsch to these kings. The epoch of the Persian invasion, which is the same as that of Psamethik III., or the year following, is usually placed at B.C. 525. It is uncertain whether Cyrus or Cambyses was the Persian king who invaded Egypt. Xenophon declares the king was Cyrus. Herodotus, while admitting conflicting views on this point, favors Cambyses.

PART II.

JEWISH CHRONOLOGY.

CHAPTER XI.

TECHNICAL CHRONOLOGY OF THE JEWS.

The Jews after the return from the Babylonian captivity used a luni-solar year. They began their year at the autumnal equinox, and to carry out the ordinance of the succession of the months, as found in the Book of Exodus, they began their first month at about the time of the vernal equinox. From this has arisen the idea that they observed two years, one ecclesiastical, beginning at the vernal equinox, and the other civil, commencing at the autumnal equinox. As far as known, they had but one year at this time; that is, one set of months intercalated in one way, but the ecclesiastical beginning was in the first month, and that belonging to the civil year in the seventh month. The ordinary luni-solar year requires the full moon of the first month to be the one next following the vernal equinox. In the earlier use of this year, it was one of observation; that is, a constant watch was kept for the return of new and full moons. This was done in connection with lunar months of thirty and twenty-nine days. One synodical month contains twenty-nine days, twelve hours, forty-four minutes, and three seconds. Two of these contain one hour, twenty-eight minutes, and six seconds more time than two months, one of thirty and the other of twenty-nine days. This difference would increase if there were no method to stop it, so that in twelve months it would amount to over eight hours, and in three years to over one day. But this was remedied by constant observation. The Greeks called the thirtieth day of the lunar month "the old and the new," because, as the synodical month was about equal to twenty-nine and one-half days, the thirtieth day belonged in part to the following month of twenty-nine days. Connected with this year was the beginning of the day at sunset. Should the conjunction of the sun and moon occur at midnight, the present beginning of the civil day, at which time we may sup-

pose the place of some star, in reference to the vernal equinox, was a part of the system, when the conditions are favorable, the crescent of the new moon, shortly after sunset, about eighteen hours or more, may be seen, and fourteen days, eighteen hours *plus*, or one-half of a mean month after the conjunction, the full moon will be seen rising at the time of sunsetting. This is a mean for the condition of things contemplated in beginning the day at sunset. From towers and elevated places watch was kept upon the moon. This was particularly close from the time the moon was at her third quarter, or the octant following. Not only was the moon's place among the stars noted at these times, but by the experience obtained from centuries of observations they knew to a nicety the time of the conjunction of the sun and moon that was to follow, and could determine some of the conditions necessary for a solar eclipse. As these observations were dependent upon an unobscured atmosphere and cloudless skies, they were often interfered with, particularly at certain seasons of the year. The days of the lunar month were put alternately at thirty and twenty-nine days, but this in a measure depended upon the visibility of the new moon in the evening which began the first day. Sometimes this was and was not the case, but it was kept generally so, which would require an additional day to be added, or two months of thirty days to come together. To avoid this constant observation and the trouble it caused, efforts were early made to form cycles of years in which the knowledge obtained from former observations was made use of to determine these things in advance. These cycles not only proposed to keep the lunar months regulated to the moon, but they were luni-solar; that is, they were to measure the solar or tropical year by means of the full moon following the vernal equinox. These cycles all contained full days, and consequently were imperfect. The observations which formerly were made for each month and year were abandoned as unnecessary. The gain was, these were only required to be made at the beginning of each cycle; it, when necessary, was to be corrected, and readjusted to the solar and lunar periods. It was due to the abandonment of this necessary rule, caused, perhaps, by a misconception of the exact amount of error in each cycle, or, more likely, by inattention to

the matter, that these cycles got so wrong and caused so much trouble and discussion among the Jews and the early Christians. Other matters were also brought in which caused much disturbance. The cycle of Meton, which is said to have been invented B.C. 432 as an extension of the eight years' cycle of Cleostratus, is as perfect as a cycle of this kind can be. The merit of Meton consists in his reducing to a calendar form the natural luni-solar cycle of nineteen years. The error in this cycle in seventy-six years, or four cycles, amounts to nearly a day. This was recognized in the cycle of Callippus, which followed that of Meton. Callippus constructed his cycle of four Metonics, from which he subtracted one day. The error in the Callippic was corrected by Hipparchus, who constructed a cycle of four Callippics, or three hundred and four years, which he also reduced an additional day. These subtractions of one day cured within the limits of an error less than a day their defects in solar and lunar time. It appears the Jews, when they abandoned the practice of constant monthly and yearly observations, took up with the Callippic cycle, which they amended by adding to it eight years, making a cycle of eighty-four years. These eight years are said to have been those of the octaëteris of Cleostratus, which contained two thousand nine hundred and twenty-two days. If this description is correct, they thereby obtained a cycle of eighty-four years, which contained a period of thirty thousand six hundred and eighty-one days, or four thousand three hundred and eighty-three weeks of seven days. This, as well as four Metonics, contained the same number of days as like numbers of Julian years, and it has been supposed this was the reason of this cycle. But in the case of the Callippic the lunar period was also followed, which in the case of that of eighty-four years was very imperfectly done. This cycle of eighty-four years, it is said, was the one used by the Jews and Christians down to A.D. 320, when Rabbi Hillel brought to the attention of the Jews the advantage which the cycle of Meton had over that of eighty-four years. One reason for the adoption of the cycle of eighty-four years by the Jews, and perhaps the chief one, was that it contained a period of full weeks. Indications of reckoning time by weeks are to be found in their system. The feast of Pentecost, or "of weeks,"

and the use of the sabbatical week of years are instances of this. Another probable reason was their acquaintance at some time with another luni-solar cycle of eighty-four years, which was different from that just described.

There are many reasons which render it doubtful that the Jewish practice after the return from captivity was in all respects like that of their earlier history. The usual description of the Jewish lunar year in no way accounts for any necessity or fitness to any scheme or system of the two beginnings of the year. Moses, in describing the time the waters of the deluge remained upon the earth, uses a month of thirty days; that is, a month belonging to a vague year like that of the Egyptians or Babylonians. In connection with this fact writers are continually describing a year of three hundred and sixty days, meaning by that an unintercalated year of that length. Such a year, I contend, never existed. The five intercalary days of the Egyptian, or the thirty of the Babylonian cycle of six years, were spaces of time leaped over; they technically did not belong to any year. "The times, times and a half of Daniel, where time means year,"* have been explained to be three and a half years of three hundred and sixty days to the year, or twelve hundred and sixty days, and used as evidence in favor of the year of three hundred and sixty days. But it is overlooked that by the Babylonian year, a year Daniel was familiar with, the intercalations were added in one body as a month of thirty days after six years of twelve months of thirty days each, and the "times, times and a half" may refer to three and a half years falling in the cycle before the intercalary month was added, if the period was one of twelve hundred and sixty days.

The great historical festivals of the Jews were observed on fixed dates, and these in later times have been directly connected with seasons of the solar year by means of a luni-solar cycle; but this is not conclusive as to the practice at the time of the institution of these feasts, unless it can be shown that the accounts require or imply the same kind of time-measurement. To determine this matter, the subject of Jewish technical chronology as derived inferentially from the Bible—there is very

* Smith's "Bible Dictionary," title Chronology (Year).

little direct information on the subject—will have to be gone over. The subject falls under the following heads: 1, days; 2, months and years; 3, intercalations; 4, the connection between the dates of the great historical or religious festivals and the time-measure; 5, Jewish cycles.

Days.—The Jewish day began at sunset. The feast of unleavened bread observed by the Jews "in the first month, on the fourteenth day of the month at even," for seven days until the even of the twenty-first day, to commemorate their departure from Egypt, began with the fifteenth and concluded *with* the twenty-first day, and not on the fourteenth and ending *in* the twenty-first, as would be understood if they began their day, like the Babylonians, at sunrise. Objections have been advanced by some writers against this being the general practice among the Jews. Whether the Jews always began their day at sunset is one thing, but whether there is anything in the Bible to give color to any diversity of practice is entirely a different matter. The writers of the Scriptures could not avoid, if they wished their meaning to be understood, certain forms of expression common to all modes of conveying ideas. If they had to write of an event as happening in the evening or morning, or that of a morning or day following an evening or night, they could do this without any reference at all to an entirely different matter, and of no consequence to what they were writing about, the chronological beginning of the day. All they may wish to say is that the events followed each other. Again, if some festivals or fasts do not begin at even, it only follows they have no chronological significance, being anniversaries simply.

In Leviticus xxiii. 5, 6 it is said, "In the fourteenth day of the first month at even is the Lord's passover. And on the fifteenth day of the same month is the feast of unleavened bread." In verses 27, 32, "Also on the tenth day of this seventh month there shall be a day of atonement. . . . It shall be unto you a sabbath of rest, and ye shall afflict your souls: in the ninth day of the month at even, from even unto even, shall ye celebrate your sabbath." Also in Leviticus xxv. 9, "Then shalt thou cause the trumpet of the jubilee to sound on the tenth day of the seventh month, in the day of atonement shall ye make the trumpet sound throughout all your land." On account of the

phraseology of these commands, it has been argued, "The lawgiver could not have designated those very evenings which he wished to belong ritually to the following (15th, 10th) day, as the evenings of the previous (14th, 9th) day."* But this is what is done in unmistakable language. Certainly in respect to the day of atonement is this the case. In one verse it is described as being on the tenth day of the month, and in another in the same connection "in the ninth day of the month from even unto even." The trumpet of jubilee was blown on the day of atonement; as this would be inconsistent with the character of the day, we must conclude it was at the end of that day, and consequently in the beginning of the eleventh day. The Jewish day began at sunset, and it is spoken of as in the evening of the previous day, because the day following can at its beginning only be described in this way. Thus, we say of our year, the 1st of January begins at midnight of the 31st of December, and if some festival was connected with its advent, the ordinance prescribing its right observance would require the celebration to begin at midnight of the 31st of December, and not at midnight of the 1st of January. The date of the beginning of a day is always given in the terms of the preceding day. As regards their beginning their days at other times, this depends upon the time-measurement employed. These beginnings are technical; that is, they belong to a system in distinction from the ordinary use of a day in the affairs of life. If in their religious heresies they adopted the false worships of the neighboring nations, they may have also fallen into other methods of measuring time, because in the adoption of a foreign ritual they would take with its prescribed ordinances relating to times and seasons the time-measurement with which they were connected.

Months and Years.—Two kinds of months are noticed in the Bible,—the lunar months and those of thirty days.† The employment of two kinds of months, to have been at all practicable, must require a distinction to be made between the subject-matters for which their respective dates are given. In ancient

* Kitto's "Biblical Cyclopædia," title Day.

† Gen. vii. 11; viii. 3, 4; I. Sam. xx. 24, 27.

times, when learning was confined to the few, it made no difference how many kinds of years and months were known to those specially interested in the measurement of time; these concerned not the great mass, and wrought no confusion in the business affairs of life. The common people, whenever history has retained any vestiges of their habits and customs, always measured time by simple ways, which had been suggested by their own experience. If among the learned, those who were interested in the historical past of a nation, a year peculiarly adapted to the purposes of history was known and used in their annals, it is in no way inconsistent with the employment of another kind of year for agricultural purposes. Again, the ordinances of festivals to be celebrated on specified dates were primarily for the information of the priests, who instructed the people in the requirements of the law. Under such a condition of things there may have been three or four kinds of years in use among the Jews: first, the agricultural year, regulated by the rising of stars or the clearly-marked beginnings of seed-time and harvest; second, the historical year, for which is used the vague, because of its special adaptation for that purpose; third, a luni-solar and a tropical year, these two being used by the priests for the purpose of regulating the prescribed dates of the ritual.

The first month is called Abib, and, as its name implies, it was the month of the beginning of harvest. The seventh month is Ethanim, and it referred in a similar way to the time of ploughing and planting. The months were also numbered from one to twelve, and were more commonly spoken of as the first, second, third, etc., months. If we understand Abib and Ethanim to be used in connection with a solar or a luni-solar year, they may be taken as more properly to be the names of seasons rather than of months, being the beginnings of spring and autumn. Before the captivity the names of only two other months are given. These are Zif, called the second month, and Bul, the eighth month. All the other months are only named by numbers. This is very much like the Roman months. In that case they were four, which were called Martius, Aprilis, Maius, Junius, and the remaining months were named by numbers. But the Jewish names differed from the Roman in their order, that of the Romans being first, second, third, and

fourth, and the Jewish first, second, seventh, and eighth. It has occurred to me that perhaps originally these were the names of the four seasons, or primeval divisions of the year; and when the year was divided into months, the old four names were retained in the Roman year as so many successive months, while those of the Jewish year were applied in a slightly different manner.

Intercalations.—The character of intercalations, their purpose and standing among the time-units, has been treated to some extent in connection with the technical chronology of the Egyptians. In that connection philosophical speculations about them, and their nature as holy, or days for religious purposes, were noticed.

In the Jewish system the holy days were sabbaths, in which all servile work was forbidden, and with these may also be included others, which, although labor was not prohibited, were signalized by special religious observances, they partaking more of the character of holidays. Counting from one equinox to the same again, the number of days will be three hundred and sixty-five; in this number there are fifty-two weekly sabbaths. Besides the weekly, they observed seven other special or annual sabbaths,—the first and last days of the feast of unleavened bread, the feast of Pentecost, and the first, tenth, fifteenth, and twenty-second days of the seventh month. Thus they kept every year fifty-nine sabbaths, or days forbidden for servile work. In addition to these, the first of every month was solemnized by the blowing of trumpets and additional sacrifices. Labor was not interdicted on these days, save that of the seventh month, which has already been counted in the fifty-nine sabbaths. This leaves eleven additional days, which with the others gives seventy days of both kinds.

The sabbath as a rest from labor is applied in the Ten Commandments to explain God's rest after the six days' work of creation, as analogous to the weekly day of rest. There are two ideas of the word rest in connection with labor or some form of activity. One is simply quiescence, and the other recuperation. Without going into any distinction more subtile than this, it can be seen that a rest preceding labor may have no relation to it save that of time, and a rest following labor

may likewise be a purely negative state. It is also true that a rest preceding labor, when of a recuperative character, stands in that relation to a previous activity, and to the labor which follows as a preparation for the same. The two aspects of this rest are found in its nature and its chronological order.

Applying the distinction above made to the creation of the world, we have the quiescence of chaos, followed by the six days' work of creation, and this terminated by the rest of the seventh day. Rest, activity, rest are repeated in this order in the beginning, development, and final result of every living organism. This law governs all life, and every form of activity. In creative order, darkness precedes light; sleep, wakefulness; death, life. The Jews in harmony began their days at sunset, the time for rest preceding that of labor. Adam while in the garden of Eden enjoyed rest. We are not told how long he remained in Eden, but from analogy, even if the period did not correspond with a sabbatical year, it was like it, and perhaps its type. Adam's creation was the last work of the sixth day, and so it has been said his first day on the earth was the sabbath day.* In all this we have the chronological order of the rest days to those of labor. The first is a sabbath, then follow six days of labor, and the eighth is a sabbath. The same order applies to the sabbatical week of years: the first year was sabbatical, then followed the six which were for labor, and the eighth year, which is also the seventh counting from the first of the six to which it is recuperative, is also sabbatical. It now remains to show how this doctrine was connected with the subject of intercalations. The conditions governing primitive man are those of the natural year. In temperate climes the season of winter is a time of rest to the earth. In a hot climate a similar rest is brought about by the intense heat of summer. One law governs all. The same conditions assert their law upon the physical constitution and habits of men. A case in point is furnished by the customs of certain aborigines of America. Volume iii., "Documentary History of New York," contains the "Description and First Settlement of New Netherland (from Wassenaer's 'Historie van Europe')." The writer in recount-

* Sermon xxv., Rev. William Ashmead.

ing the customs of the aborigines says they had a year of ten months. "Of January and December they take no note, being of no use to them." This year is solar. It contained ten months and an intercalary period equal to about two months. Supposing these savages desired to count all of the time. They would not wish to do this unless for something akin to an historical purpose. Two ways were open to them,—either to add two more months to the year, or to begin to count another ten where the other left off. That they were more likely to add two months than to count another ten is quite doubtful. It is known the ancients timed their agricultural pursuits by the risings and settings of stars, with the moon as subsidiary; all that would be necessary would be the numbering the moons from and between such risings and settings. This year satisfied all ordinary wants, and if a year of ten months was adopted for other purposes it in no way interfered with the agricultural methods of determining time. Certainly, when the year is reckoned by the rising and setting of stars at certain seasons there is no need of a year of twelve months. As one writer remarks, "For purposes of historical denotation, it matters not what method of dividing, arranging, and naming the portions of time may be adopted, provided the method be constant and the information capable of rendering an answer to the question, How long ago?"* These aborigines, in their simple and animal-like mode of living, obeyed in companionship with surrounding nature the common law of the season. Taking these as a sample of primitive man, their habits may be compared with those produced by the growth of civilization. As society advances in refinement the objects to obtain which labor is done increase, the arts multiply, and the consequence is labor is augmented to a corresponding degree. The old law of rest that men involuntarily obeyed is broken. The needs of society are now changed. Men must labor more continuously, and consequently the time of rest is no longer one season, but separated into days, and these arranged generally among those given to labor. To the Jew the command came; it was no new monition, but the old law once obeyed: "Six days thou shalt labor, and do all thy work: But

* Henry Brown, Kitto's "Biblical Cyclopædia," title Chronology.

the seventh day is the sabbath of the Lord thy God: in it thou shalt not do any work." The relation of the number of days of rest, God's days, to those of labor continues the same. The whole time of rest may be put at two months; it may, according to circumstances, be a little more, and even less. The Jewish year has been shown to have had fifty-nine sabbaths, which is the number of days in two lunar months, which leaves ten out of twelve lunar months for labor. If the fifty-nine sabbaths are separated from the year of three hundred and sixty-five days, the number of days remaining is three hundred and six, which is two days more than the Romulian year of ten months, and if from these the eleven additional days which complete the seventy of the Jewish year be taken, the remainder is again two hundred and ninety-five days, or ten lunar months.

Whether the Jews made use of a year of ten months, alluded to here, depends, like the argument in favor of the Romulian year, by its effect upon chronology. The Jewish tithing was a tenth of the yearly increase, and likewise a tenth was the king's tax, which are as much evidences of a year of ten months as the somewhat similar use of the number ten by the Romans was of their Romulian year.

Cycles.—The system of Moses is found in the fixed yearly festivals of the Jews, their place in the year, their number and duration, and other details, which were on the model of the time-measurement.

These festivals were weekly, monthly, yearly, cyclical, epochal, and agricultural.

The weekly festival was on the sabbath, the monthly in the beginning of the month, the yearly in the beginning of the month that commenced the year, the cyclical every seventh* and fiftieth year (the sabbatical and jubilee years), the epochal the great annual festivals which were memorials of their coming out of Egypt, and the agricultural the festivals of harvest.

The Bible account of those connected with the exodus is as follows (Exodus xi. 4, 5): "And Moses said, Thus saith the Lord, About midnight will I go out into the midst of Egypt: And all the firstborn in the land of Egypt shall die." (xii. 2)

* The seventh beginning the count with the morrow after a sabbath, but the eighth including both extremes.

"This month shall be unto you the beginning of months: it shall be the first month of the year to you." (xii. 3) "In the tenth day of this month they shall take to them every man a lamb." (xii. 6–8) "And ye shall keep it up until the fourteenth day of the same month: and the whole assembly of the congregation of Israel shall kill it in the evening. And they shall take of the blood, and strike it on the two side posts and on the upper door post of the houses. . . . And they shall eat the flesh in that night, roast with fire, and unleavened bread." (xii. 11, 12) "And thus shall ye eat it; with your loins girded, your shoes on your feet, and your staff in your hand; and ye shall eat it in haste: it is the Lord's passover. For I will pass through the land of Egypt this night, and will smite all the firstborn in the land." (xii. 14–18) "And this day shall be unto you for a memorial; and ye shall keep it a feast to the Lord throughout your generations: ye shall keep it a feast by an ordinance for ever. Seven days shall ye eat unleavened bread. . . . And in the first day there shall be a holy convocation, and in the seventh day there shall be a holy convocation to you; no manner of work shall be done in them, save that which every man must eat, that only may be done of you. And ye shall observe the feast of unleavened bread; for in this selfsame day have I brought your armies out of the land of Egypt: therefore shall ye observe this day in your generations by an ordinance for ever. In the first month, on the fourteenth day of the month at even, ye shall eat unleavened bread, until the one and twentieth day of the month at even." (xii. 51) "And it came to pass the selfsame day, that the Lord did bring the children of Israel out of the land of Egypt by their armies." (xiii. 4) "This day came ye out in the month Abib."

The corresponding feasts of the seventh month are given as follows: (Leviticus xxiii. 24) "In the seventh month, in the first day of the month, shall ye have a sabbath, a memorial of blowing of trumpets, a holy convocation." (xxiii. 27) "Also on the tenth day of this seventh month there shall be a day of atonement: it shall be a holy convocation unto you; and ye shall afflict your souls." (xxiii. 32) "It shall be unto you a sabbath of rest, and ye shall afflict your souls: in the ninth day of the month at even, from even unto even, shall ye celebrate your

sabbath." (xxiii. 34–36) "The fifteenth day of this seventh month shall be the feast of tabernacles for seven days unto the Lord. On the first day shall be a holy convocation: ye shall do no servile work therein. Seven days ye shall offer an offering made by fire unto the Lord; on the eighth day shall be a holy convocation unto you, and ye shall offer an offering made by fire unto the Lord; . . . ye shall do no servile work therein." (xxiii. 39) "In the fifteenth day of the seventh month, when ye have gathered in the fruit of the land, ye shall keep a feast unto the Lord seven days: on the first day shall be a sabbath, and on the eighth day shall be a sabbath." (xxiii. 41–43) "It shall be a statute for ever in your generations; ye shall celebrate it in the seventh month. Ye shall dwell in booths seven days; all that are Israelites born shall dwell in booths: That your generations may know that I made the children of Israel to dwell in booths, when I brought them out of the land of Egypt."

I. The tenth day of the first month on which the paschal lamb was selected pairs with the day of atonement on the tenth day of the seventh month. These are properly last days, or days at beginnings. The tenth day of the first month is connected with the departure from Egypt, the end of the servitude there, and the beginning of the nation; and the tenth day of the seventh month, besides having this reference, is a day of atonement for that which is past, and naturally closes the year. It is not meant that every year closed with the tenth day of the seventh month, but that this is an epochal day, and that some chronological period ended on this day. The jubilee cycle or year began on the day following the day of atonement every fiftieth year.

II. The feast of unleavened bread in the first month is described as lasting seven days, from the 15th to the 21st, inclusive, the first and seventh days being sabbaths. The corresponding feast of tabernacles in the seventh month is described also as of seven days, but the first and eighth days are mentioned as sabbaths. In the case of the first month, it will be noticed, the dates of the first and concluding days of the feast are given, while only that of the first day of the feast of tabernacles is on record. This omission has its significance. I find the explanation of this in their analogy to two cycles, or rather to two forms of the same cycle. I understand the feast of unleavened bread

to be in the form of a cycle of six years, the first day referring to the first year of the cycle, and the seventh day to the first year of the second or following cycle of six years. I also understand the feast of tabernacles for seven days to be in the manner of a cycle of seven years, the first day referring to the first year of the cycle, and the eighth day to the first year of a second cycle of seven years. Both extremes, but in a different manner, are counted: the period in the first instance is six years, in the second seven years. In the first the numbers are six and seven, and their multiple forty-two years; in the second, the numbers are seven and seven, and their multiple forty-nine years. The reason why both extremes are not directly counted, but only implied in the description of the feast of tabernacles, is to avoid the multiple of seven and eight, the cycle intended being one of forty-nine, and not of fifty-six years.

To support this view certain technicalities belonging to the art of forming cycles may be cited. It is desirable, when possible, that the system, including in this term all the time-measures, both great and small, should have one common model. The divisions of the smaller time-units are repeated in the larger, and only distinguished from them by the addition of the word "great" or some other expression equally good for the purpose of identification and correlation. The sabbatical week of years is so called because it is formed on the model of the week of seven days. The jubilee year was a fiftieth year, as the feast of Pentecost was a fiftieth day. Cycles which will permit of it are on the analogy of the ordinary year divided into seasons, months, and days, these representing great periods of time. In the foregoing discussion I have thought the days of the feasts of unleavened bread and of tabernacles were upon the model of the week and the sabbatical year.

The propriety of this is advanced in the hypothesis about to be set forth to explain the jubilee cycle of the Jews.

The phenomena of the solar year are associated with these festivals by a tradition or custom of the Jews, and perhaps this is confirmed, if the Lord's passover had its celestial symbol in the crossing of the sun from the south to the north side of the equator.

III. The feast of weeks or Pentecost was counted from such time as they began to put the sickle to the corn. (Deut. xvi. 9.)

Notice, here nothing is said about the equinox or the full moon. This should be kept in mind, because after the captivity with a year luni-solar in character, the fiftieth day was reckoned in reference to the full moon of Abib.

When they first put the sickle to the corn they were to bring a sheaf of the first fruits to the priest, and on the morrow after the sabbath he was to wave it before the Lord. They were to count from the morrow until seven sabbaths were complete,—that is, forty-nine days, unto the morrow after the seventh sabbath, the fiftieth day,—when they were to offer a new meat offering unto the Lord. (Leviticus xxiii. 10–16.)

IV. *The Sabbatical and Jubilee Years.*—(Leviticus xxv. 1–12) "And the Lord spake unto Moses in mount Sinai, saying, Speak unto the children of Israel, and say unto them, When ye come into the land which I give you, then shall the land keep a sabbath unto the Lord. Six years thou shalt sow thy field, and six years thou shalt prune thy vineyard, and gather in the fruit thereof; But in the seventh year shall be a sabbath of rest unto the land, a sabbath for the Lord: thou shalt neither sow thy field, nor prune thy vineyard. That which groweth of its own accord of thy harvest thou shalt not reap, neither gather the grapes of thy vine undressed; for it is a year of rest unto the land. And the sabbath of the land shall be meat for you; for thee, and for thy servant, and for thy maid, and for thy hired servant, and for thy stranger that sojourneth with thee, And for thy cattle, and for the beast that are in thy land, shall all the increase thereof be meat. And thou shalt number seven sabbaths of years unto thee, seven times seven years; and the space of the seven sabbaths of years shall be unto thee forty and nine years. Then shalt thou cause the trumpet of the jubilee to sound on the tenth day of the seventh month, in the day of atonement shall ye make the trumpet sound throughout all your land. And ye shall hallow the fiftieth year, and proclaim liberty throughout all the land unto all the inhabitants thereof: it shall be a jubilee unto you; and ye shall return every man unto his possession, and ye shall return every man unto his family. A jubilee shall that fiftieth year be unto you: ye shall not sow, neither reap that which groweth of itself in it, nor gather the grapes in it of thy vine undressed. For it is

the jubilee; it shall be holy unto you: ye shall eat the increase thereof out of the field." (xxv. 20–22) "And if ye shall say, What shall we eat the seventh year? behold, we shall not sow, nor gather in our increase: Then I will command my blessing upon you in the sixth year, and it shall bring forth fruit for three years. And ye shall sow the eighth year, and eat yet of old fruit until the ninth year; until her fruits come in ye shall eat of the old store."

They were to sow their fields and prune their vineyards, and gather in the fruit thereof for six years, but the seventh was to be a sabbath to the land, when all this was forbidden. The jubilee year followed after seven sabbatical years,—that is, a space of forty-nine years,—and it is described as a sabbatical year with additional regulations, such as the manumission of all slaves and servants, the release of all mortgaged lands, and the return of houses and lands sold to their original owners.

Here has arisen a difficulty. Some have supposed the jubilee year to be identical with the last year of the seven sabbatical weeks of years,—that is, with the forty-ninth year; holding to this view contrary to the express statement of the Bible, that it was a fiftieth year. They were led to this by the statements in verses 20–22. To the question proposed, What should they eat the seventh year? the answer is, The sixth year shall be blessed so that it shall bring forth fruit for three years: they were to sow the eighth year, and eat of the old fruit until they had reaped the harvest of the ninth year. They say, If the jubilee year followed the seventh sabbatical, or forty-ninth year, then, two sabbatical years coming together, a famine would be the consequence, and there is no record of any such disastrous result following the observance of the sabbatical years. In this case they would sow and eat of the old fruit until the harvest of the tenth year, and the sixth year would have to bring forth fruit for four years instead of three. The misunderstanding of the Bible on this point is one of the curiosities of history. All difficulty is removed by a very simple explanation. It is suggested by the first words used in the decree: "When ye come into the land which I give you, then shall the land keep a sabbath unto the Lord." This may either mean the first year in the land of Canaan, or the year they received and entered upon

their lands; at all events, the command was not obligatory until circumstances made it possible to be obeyed.

The sabbatical week of years had its epoch, and that epoch was a natural sabbatical year. The first year in Canaan was of this character, and so also would be the first year of their settlement upon their lands. In neither case are six years of agricultural labor in precedence; still, the natural sabbatical year falls in a supposed series as a seventh or rest year. This subject has been already treated under the head of Intercalations.

The language used in Joshua v. 11, 12, is descriptive of a sabbatical year: "They did eat of the old corn of the land on the morrow after the passover, unleavened cakes, and parched corn in the selfsame day. And the manna ceased on the morrow after they had eaten of the old corn of the land; . . . but they did eat of the fruit of the land of Canaan that year." The first year is sabbatical; this is followed by six years of labor, and the next following year, which is the seventh counting from the first of the six of labor, is sabbatical, and it is the eighth year counting from the sabbatical epoch, the first sabbatical year.

See how simply this view explains the supposed difficulty in Jeremiah xxxiv. 8–14. The covenant between God and the children of Israel as to the part of the latter is described in the fourteenth verse: "At the end of seven years let ye go every man his brother a Hebrew, which hath been sold unto thee; and when he hath served thee six years, thou shalt let him go free from thee." Because the service was six years, and they were to be let go at the end of the seventh year, some have resorted to the stupid subtlety of supposing the seventh year to have had two ends like a line, and that the end of the seventh meant the beginning end. The explanation of this passage lies in the view already given of the sabbatical period. The first year was sabbatical; then followed six years of labor, completing a period of seven years, or, as it was called, the week of years. The six years of service corresponded to the six years of labor, and the end of the seventh year was the end of the sixth year of labor; therefore at the end of this year the six years of service were completed, and they were to be liberated at the beginning of the following year, which was sabbatical.

We may conclude from all this that there were two methods of counting,—one referring to the economic regulations of the sabbatical week of years, and the other to an epoch or beginning.

In counting the number of years their lands were to be cultivated, their usufruct parted with, their servitude to last, the sabbatical and jubilee years were the termini, or afforded the boundaries at which these terms came to an end. Because the land was to rest after six years of cultivation, the sabbatical year becomes an adjunct for rest. But chronologically they are the years with which the count begins, and they should be numbered in their order,—first, eighth, fifteenth, twenty-second, twenty-ninth, thirty-sixth, forty-third, and fiftieth years.

The grouping of years into periods, if not done for convenience of counting them or some economy into which time enters as an element, must be traced to an astronomical cause.

The seven and forty-nine years of the sabbatical and jubilee terms, if of years according to the Egyptian vague or Babylonian cycle, do not contain full periods of lunar or sidereal months nor of tropical or sidereal years. Forty-nine, if cyclic in itself, must undergo an interpretation different from what is commonly given to it. If we turn to the account of the jubilee cycle, we find it was announced in the day of atonement. This was at even of the tenth day of the month, for the jubilee year began with the eleventh day of the seventh month. The jubilee year and an eighth sabbatical year were identical; therefore the eighth sabbatical, which should have had its beginning on the 1st of the seventh month, is put forward ten days, and a new beginning is made with the 11th of the month, which when it arrives is changed to the first day of the same month. In other words, the year at the beginning of the jubilee is intercalated ten days. The period to which this intercalation is made is certainly connected with the number seven. But it cannot be that of forty-nine years of twelve months, because in this time the tropical points advance in the vague eleven days, twenty hours, *plus*. The number of years to which ten intercalary days are fitted is that of forty-two, in which time the advance is ten days, four hours, *plus*. The portion of a day is omitted, and the right intercalation of forty-two vague years to make them tropical is

ten days. This will make the average length of each year about six minutes less than the mean tropical, and which is a nearer following of the true solar year, for this number of years, than the Gregorian year makes. This number cannot be brought within the terms of the forty-nine sabbatical years unless it can be shown that forty-nine and forty-two stand for the same period of time. It may be in this way: The sabbatical years, being a rest to the land, were years of twelve months; they covered seed-time and harvest. The same necessity does not belong to the other years of the cycle. If they were of ten months, then the sabbatical week of years contained one year of twelve months followed by six of ten months, or, in all, seven mixed years. Six years of ten months contain sixty months, which are equal to five years of twelve months, hence the seven mixed years equal six of twelve months. Seven times six of twelve months equal forty-two years, which equal seven times seven mixed years, or forty-nine years. It may now be understood what was meant by the blessing on the sixth year, that it may bear fruit for three years; it was the last year of the sabbatical cycle, it was the sixth decimestrial year of labor, and the last and sixth year of the cycle as of years of twelve months. Jeremiah calls this last year the seventh, and he speaks of it as of seven mixed years, if the above explanation is correct. In the discussion of the feasts of unleavened bread and tabernacles this condition of things was hinted at. The feast of unleavened bread was for seven days, the first and last days of which were sabbaths; so by the week of six years we have first year a sabbath, *plus* five years, *plus* a sabbath, seven years corresponding to the seven days of the feast. The feast of tabernacles was also for seven days; it corresponded, in some way which did not then appear, with the seven days of the feast of unleavened bread. The first and eighth days of this feast were sabbaths, so by the week of seven mixed years we have first year a sabbath, *plus* six years, *plus* a sabbath. The six years are equal to five; and in this way there are seven years corresponding to the seven days given for the feast, and the peculiar phraseology which asserts it was for seven days, and yet gives the first and eighth days as sabbaths, is explained by its reference to the cycle of seven mixed years.

The following exhibition of the jubilee cycle contains the detail of years of the first week of years in two forms. The totals of the remaining weeks of years are like the first, except the last, which has ten intercalary days added at its end:

First Week of Years.

	Babylonian Year.		Egyptian Year.	
First	year-day equals	360 days.	1 equals	365 days.
Second	" " "	300 "	2 "	300 "
Third	" " "	300 "	3 "	305 "
Fourth	" " "	300 "	4 "	305 "
Fifth	" " "	300 "	5 "	305 "
Sixth	" " "	300 "	6 "	305 "
Seventh	" " "	300 "	7 "	305 "
				2190 "
Intercalary month		30 "		
		2190 "		

Egyptian and Babylonian.

First	week of years equals	2,190 days.
Second	" "	2,190 "
Third	" "	2,190 "
Fourth	" "	2,190 "
Fifth	" "	2,190 "
Sixth	" "	2,190 "
Seventh	" "	2,190 "
		15,330 "
Intercalary days		10 "
		15,340 "

The sabbatical and jubilee years appear to have been disregarded by the Jews with perhaps one or two exceptions. In II. Chronicles xxxvi. 21 it is said of the captivity of Babylon, it was "To fulfil the word of the Lord by the mouth of Jeremiah, until the land had enjoyed her sabbaths: for as long as she lay desolate she kept sabbath, to fulfil threescore and ten years."

V. *Eponymous Cycles.*—Some matters will be repeated here which have been gone over in connection with the Egyptian system. These are to explain the number forty, which is so often met with in the Jewish lists.

A cycle may be a period determined by the occurrence and

repetition of astronomical phenomena, or it may be a division formed for the convenience of counting, following, for instance, the decimal system. The number forty has two significations: in one it means a period of forty sidereal years, which is one-fourth of one hundred and sixty years, this last being a period in which the sidereal advances forty-one days in the vague.

The decimestrial year is used to divide the century into three or four parts or periods. One hundred vague years contain twelve hundred months, which, divided into generations, three to a century, give four hundred months to each, and these reduced to years of ten months give forty for each third of a century. By the lunar month twenty-five vague years are one hour *plus* longer than three hundred and nine synods of the moon. These divide the century into four seasons or generations each of twenty-five vague years, or of thirty decimestrial lunar years, with nine intercalary months added at the beginning of each. This will cause twelve hundred and thirty-six lunar months to fall short of a century of vague years by four hours *plus*. These when divided into generations, three to a century, will give four hundred and twelve months to each, and these are represented by forty decimestrial lunar years *plus* one (interealary) of twelve months. We find both numbers forty and forty-one in the Bible, and probably in some instances they express within a few hours the same periods of time. These were eponymous cycles. One of these begins with the judgeship of Othniel. In perusing a list of eponymous cycles, it is not necessary to understand that they represent the number of years each eponym was actually in authority. He may have been a ruler before the cycle to which he gave his name had its beginning; also he may die before its close, and it is possible that one or more successors may rule, die, or lose their power in some way before the close of the same cycle.

The list of eponyms, unless their terms are very short, may not, and doubtless never does, contain a complete roll of all the rulers for the period it covers. What constitutes the character of the eponym is the official part performed and the authority assumed by the ruler at the inauguration of the cycle. It is a small matter whether Othniel, Ehud, and the other judges,

whose terms are put at forty years, ruled the entire terms given them. What is of importance to be known and insisted upon is that time can just as accurately be measured by such cycles as by years. A year is no more than a cycle of months, a generation is a cycle of years, and eponyms of cycles have a chronological value fully as good as eponyms of years. The effect of this view upon the character of Jewish chronology from the exodus down to the division of the kingdom is of some consequence; for without it the number forty is relegated to the list of round numbers, or averages, and is deprived of its historical verity.

It is no argument against the eponymous character of this number as found in this first portion of Jewish history, because of the circumstance that these cycles are not continuous. This was a period of great confusion, and one in which they were frequently in captivity to neighboring nations. The author of the chronology made up the list in part of eponymous cycles, giving to each eponym forty decimestrial years, and in part of certain times of captivity given in years of twelve months; also the terms of other judges, also in years of twelve months, who were not the eponyms of cycles.

But to the objection which still may be brought forward to the list containing exactly so many eponymous cycles, and the captivities of being of exactly so many years, and the other judges ruling exactly the number of years given to them, as being incredible, it may be replied: The list probably does not contain a full roll of all those who ruled over the Jews during this period. Some of these are omitted, because it was desirable to retain the eponymous cycles. These were omitted just as the years of Shamgar were, who judged Israel, probably, during the second eponym of Ehud, because his term fell in with the latter part of that, and terminated, perhaps, with the captivity to Jabin. In the same way, in order to preserve the eponyms, those portions of the captivities and non-eponymous judgeships which fell in with them were omitted. In this way the integrity of the eponyms is preserved, and they and the period down to the rebellion of Jeroboam I. are confirmed by other data, which will be furnished when this portion of the history comes under consideration.

CHAPTER XII.

THE HISTORICAL CHRONOLOGY OF THE JEWS.

The historical chronology is divided into two parts. The first extends from the exodus to the reign of Rehoboam; the second part completes the history.

PART I.

From the Exodus to Rehoboam. Chronological Data.

I. *Wanderings in the Wilderness.*—This period is given in Numbers xiv. 33 as forty years. It is a question whether these are years of twelve or ten months. In the latter case they equal thirty-three and one-third years of twelve months.

II. *Division of Lands.*—No years for the period between the crossing of the Jordan and the judgeship of Othniel are given in the Bible except the eight years of the captivity to Mesopotamia, which came to an end when Othniel became judge. Some find a longer period than the eight implied in the book of Joshua. They are derived from Caleb's statement of his own age at the time of the division of lands (Joshua xiv. 7, 10). He was forty years old when he and his companions set out from Kadesh-barnea to spy out the land, and he is now eighty-five years old, a period of forty-five years having elapsed. This places the division of lands in the forty-seventh year of the exodus. The two schemes affect this item, for by one the years are of twelve months, and by the other of ten months.

III. *Judgeship of Joshua.*—Josephus gives Joshua a judgeship of twenty-five years. The figures seem to be derived from Caleb's statement, because they make Joshua eighty-five years old at the crossing of the Jordan, which was the age of Caleb at the division of lands. The two schemes are so arranged that the death of Joshua, according to Scheme I., is fifteen years (twelve months) after the death of Moses, Scheme II.

The items are as follows:

1. In the wilderness	40	years.	Numbers xiv. 33
2. Captivity to Mesopotamia	8	"	Judges iii. 8
3. Othniel, judge	40	"	" iii. 11
4. Captivity to Moab	18	"	" iii. 14
5. Ehud, judge	80	"	" iii. 30
6. Shamgar, judge	0	"	" iii. 31
7. Captivity to Jabin	20	"	" iv. 3
8. Deborah and Barak	40	"	" v. 31
9. Captivity to Midian	7	"	" vi. 1
10. Gideon	40	"	" viii. 28
11. Abimelech	3	"	" ix. 22
12. Tola	23	"	" x. 2
13. Jair	22	"	" x. 3
14. Captivity to Philistia	18	"	" x. 8
15. Jephthah	6	"	" xii. 7
16. Ibzan	7	"	" xii. 9
17. Elon	10	"	" xii. 11
18. Abdon	8	"	" xii. 14
19. Captivity to Philistia	40	"	" xiii. 1

The years Samson judged Israel are included in the forty years' servitude to Philistia. "And he judged Israel twenty years" (Judges xvi. 31). "He judged Israel in the days of the Philistines twenty years" (Judges xv. 20).

20. Eli, judge	40	years.	I. Samuel iv. 18
21. Saul, king	40	"	

The years of Saul are inferred from several statements in the Bible. The description of Saul in I. Samuel ix. 2 is "A choice young man, and a goodly." On the authority of those best able to decide a question of this kind this meant a young man of age, but unmarried. "Ish-bosheth, Saul's son, was forty years old when he began to reign over Israel, and reigned two years" (II. Samuel ii. 10).

22. David, king	40	years.	I. Kings ii. 11

"Seven years reigned he in Hebron, and thirty and three years reigned he in Jerusalem."

23. Solomon	40	years.	I. Kings xi. 42

24. In the four hundred and eightieth year after the children of Israel were come out of Egypt, in the fourth year of his reign, in the second month Zif, Solomon began to build the house of the Lord (I. Kings vi. i). In the Septuagint version this period is put at four hundred and forty years. "In II. Chronicles iii. 2 (the parallel passage) there is no date. Josephus, Theophilus, and others who have left systems of chronology seem to be ignorant of this computation, which is first mentioned in the fourth century by Eusebius, and he does not

adopt it."* In the older books, such as Exodus, Deuteronomy, Numbers, Judges, and I. Samuel, a space of more than five hundred years may be counted for the same period. No effort is made in the Bible to explain or remove the difficulty. The consequence is, two opposing views are held. One class of critics, insisting on the long chronology, claims the statement of four hundred and eighty years in I. Kings to be an instance of corrupted text. Another, advocating the short chronology, insists upon the retention of the four hundred and eighty years, and endeavors to harmonize everything by supposing certain terms of years, especially some of those mentioned in the Book of Judges, to be contemporaneous.

I do not propose to discuss this matter. The purpose is to show that the numbers as they stand in the older books are in agreement with the period of four hundred and eighty years, and if this number of years was inserted into the text at a later date than the composition of the Books of Kings, it was a result derived from a computation and interpretation of those numbers.

Chronological Table.

EXODUS TO THE REIGNS OF REHOBOAM AND JEROBOAM I.

B.C.	Era of Tabernacle.	Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
1397		1– 2	Exodus to crossing 1	Exodus to cross- 1– 2
1396	1	2– 3	of the Jordan. 2	ing of the Jor- 2– 3
1395	2	3– 4	3	dan. 3– 4
1394	3	4– 5	4	4– 5
1393	4	**5– 6**	5	5– 6
1392	5	7– 8	6	7– 8
1391	6	8– 9	7	8– 9
1390	7	9–10	8	9–10
1389	8	10–11	9	10–11
1388	9	**11–12**	10	11–12
1387	10	13–14	11	13–14
1386	11	14–15	12	14–15
1385	12	15–16	13	15–16
1384	13	16–17	14	16–17
1383	14	**17–18**	15	17–18
1382	15	19–20	16	19–20
1381	16	20–21	17	20–21
1380	17	21–22	18	21–22
1379	18	22–23	19	22–23
1378	19	**23–24**	20	23–24
1377	20	25–26	21	25–26
1376	21	26–27	22	26–27
1375	22	27–28	23	27–28

* "The Bible Hand-Book" (Angus), p. 214.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Decimestrial Years.	Chronological Arrangement.			
			Scheme I.		Scheme II.	
1374	23	28–29		24		28–29
1373	24	**29–30**		25		29–30
1372	25	31–32		26		31–32
1371	26	32–33		27		32–33
1370	27	33–34		28		33–34
1369	28	34–35		29		34–35
1368	29	**35–36**		30		35–36
1367	30	37–38		31		37–38
1366	31	38–39		32		38–39
1365	32	39–40		33	Death of Moses.	39–40
1364	33	40– 1		34	Crossing of	40– 1
1363	34	1– 2		35	the Jordan.	1– 2
1362	35	3– 4		36		3– 4
1361	36	4– 5		37		4– 5
1360	37	5– 6		38		5– 6
1359	38	6– 7		39		6– 7
1358	39	7– 8	Death of Moses.	40	Division of	7– 8
1357	40	9–10	Crossing of the	1	lands. Death	1
1356	41	10–11	Jordan.	2	of Joshua.	2
1355	42	11–12		3	Captivity to	3
1354	43	12–13		4	Mesopotamia.	4
1353	44	**13–14**		5		5
1352	45	15–16		6		6
1351	46	16–17	Division of lands.	7		7
1350	47	17–18	Death of Joshua.	1	Othniel.	1– 8
1349	48	18–19	Captivity to Mes-	2		1
1348	49	**19–20**	opotamia.	3		2– 3
1347	50	21–22		4		4
1346	51	22–23		5		5
1345	52	23–24		6		6
1344	53	24–25		7		7
1343	54	**25–26**	Othniel.	1– 8		8– 9
1342	55	27–28		2		10
1341	56	28–29		3		11
1340	57	29–30		4		12
1339	58	30–31		5		13
1338	59	**31–32**		6– 7		14–15
1337	60	33–34		8		16
1336	61	34–35		9		17
1335	62	35–36		10		18
1334	63	36–37		11		19
1333	64	**37–38**		12–13		20–21
1332	65	39–40		14		22
1331	66	40– 1		15		23
1330	67	1– 2		16		24
1329	68	2– 3		17		25
1328	69	**3– 4**		18–19		26–27
1327	70	5– 6		20		28
1326	71	6– 7		21		29

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.		
			Scheme I.		Scheme II.
1325	72	7– 8		22	30
1324	73	8– 9		23	31
1323	74	**9–10**		24–25	32–33
1322	75	11–12		26	34
1321	76	12–13		27	35
1320	77	13–14		28	36
1319	78	14–15		29	37
1318	79	**15–16**		30–31	38–39
1317	80	17–18		32	40– 1 Captivity to
1316	81	18–19		33	2 Moab.
1315	82	19–20		34	3
1314	83	20–21		35	4
1313	84	**21–22**		36–37	5
1312	85	23–24		38	6
1311	86	24–25		39	7
1310	87	25–26	Captivity to	40– 1	8
1309	88	26–27	Moab.	2	9
1308	89	**27–28**		3	10
1307	90	29–30		4	11
1306	91	30–31		5	12
1305	92	31–32		6	13
1304	93	32–33		7	14
1303	94	**33–34**		8	15
1302	95	35–36		9	16
1301	96	36–37		10	17
1300	97	37–38		11	18– 1 Ehud.
1299	98	38–39		12	2
1298	99	**39–40**		13	3
1297	100	1– 2		14	4
1296	101	2– 3		15	5
1295	102	3– 4		16	6
1294	103	4– 5		17	7
1293	104	**5– 6**	Ehud.	1–18	8– 9
1292	105	7– 8		2	10
1291	106	8– 9		3	11
1290	107	9–10		4	12
1289	108	10–11		5	13
1288	109	**11–12**		6– 7	14–15
1287	110	13–14		8	16
1286	111	14–15		9	17
1285	112	15–16		10	18
1284	113	16–17		11	19
1283	114	**17–18**		12–13	20–21
1282	115	19–20		14	22
1281	116	20–21		15	23
1280	117	21–22		16	24
1279	118	22–23		17	25

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
1278	119	**23–24**	18–19	26–27
1277	120	25–26	20	28
1276	121	26–27	21	29
1275	122	27–28	22	30
1274	123	28–29	23	31
1273	124	**29–30**	24–25	32–33
1272	125	31–32	26	34
1271	126	32–33	27	35
1270	127	33–34	28	36
1269	128	34–35	29	37
1268	129	**35–36**	30–31	38–39
1267	130	37–38	32	40
1266	131	38–39	33	41
1265	132	39–40	34	42
1264	133	40– 1	35	43
1263	134	**1– 2**	36–37	44–45
1262	135	3– 4	38	46
1261	136	4– 5	39	47
1260	137	5– 6	40	48
1259	138	6– 7	41	49
1258	139	**7– 8**	42–43	50–51
1257	140	9–10	44	52
1256	141	10–11	45	53
1255	142	11–12	46	54
1254	143	12–13	47	55
1253	144	**13–14**	48–49	56–57
1252	145	15–16	50	58
1251	146	16–17	51	59
1250	147	17–18	52	60
1249	148	18–19	53	61
1248	149	**19–20**	54–55	62–63
1247	150	21–22	56	64
1246	151	22–23	57	65
1245	152	23–24	58	66
1244	153	24–25	59	67
1243	154	**25–26**	60–61	68–69
1242	155	27–28	62	70
1241	156	28–29	63	71
1240	157	29–30	64	72
1239	158	30–31	65	73
1238	159	**31–32**	66–67	74–75
1237	160	33–34	68	76
1236	161	34–35	69	77
1235	162	35–36	70	78
1234	163	36–37	71	79
1233	164	**37–38**	72–73	80– 1 Captivity to
1232	165	39–40	74	2 Jabin.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.			
			Scheme I.		Scheme II.	
1231	166	40– 1		75	3	
1230	167	1– 2		76	4	
1229	168	2– 3		77	5	
1228	169	**3– 4**		78–79	6	
1227	170	5– 6	Captivity to	80– 1	7	
1226	171	6– 7	Jabin.	2	8	
1225	172	7– 8		3	9	
1224	173	8– 9		4	10	
1223	174	**9–10**		5	11	
1222	175	11–12		6	12	
1221	176	12–13		7	13	
1220	177	13–14		8	14	
1219	178	14–15		9	15	
1218	179	**15–16**		10	16	
1217	180	17–18		11	17	
1216	181	18–19		12	18	
1215	182	19–20		13	19	
1214	183	20–21		14	20– 1	Deborah and
1213	184	**21–22**		15	1– 2	Barak.
1212	185	23–24		16	3	
1211	186	24–25		17	4	
1210	187	25–26		18	5	
1209	188	26–27		19	6	
1208	189	**27–28**		1–20	7– 8	
1207	190	29–30	Deborah and Ba-	2	9	
1206	191	30–31	rak.	3	10	
1205	192	31–32		4	11	
1204	193	32–33		5	12	
1203	194	**33–34**		6– 7	13–14	
1202	195	35–36		8	15	
1201	196	36–37		9	16	
1200	197	37–38		10	17	
1199	198	38–39		11	18	
1198	199	**39–40**		12–13	19–20	
1197	200	1– 2		14	21	
1196	201	2– 3		15	22	
1195	202	3– 4		16	23	
1194	203	4– 5		17	24	
1193	204	**5– 6**		18–19	25–26	
1192	205	7– 8		20	27	
1191	206	8– 9		21	28	
1190	207	9–10		22	29	
1189	208	10–11		23	30	
1188	209	**11–12**		24–25	31–32	
1187	210	13–14		26	33	
1186	211	14–15		27	34	
1185	212	15–16		28	35	

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.		
			Scheme I.		Scheme II.
1184	213	16–17		29	36
1183	214	**17–18**		30–31	37–38
1182	215	19–20		32	39
1181	216	20–21		33	40– **1** Captivity to
1180	217	21–22		34	2 Midian.
1179	218	22–23		35	3
1178	219	**23–24**		36–37	4
1177	220	25–26		38	5
1176	221	26–27		39	6
1175	222	27–28		40– 1	7– 1 Gideon.
1174	223	28–29	Captivity to	2	1
1173	224	**29–30**	Midian.	3	2– 3
1172	225	31–32		4	4
1171	226	32–33		5	5
1170	227	33–34		6	6
1169	228	34–35		1– 7	7
1168	229	**35–36**	Gideon.	1– 2	8– 9
1167	230	37–38		3	10
1166	231	38–39		4	11
1165	232	39–40		5	12
1164	233	40– 1		6	13
1163	234	**1– 2**		7– 8	14–15
1162	235	3– 4		9	16
1161	236	4– 5		10	17
1160	237	5– 6		11	18
1159	238	6– 7		12	19
1158	239	**7– 8**		13–14	20–21
1157	240	9–10		15	22
1156	241	10–11		16	23
1155	242	11–12		17	24
1154	243	12–13		18	25
1153	244	**13–14**		19–20	26–27
1152	245	15–16		21	28
1151	246	16–17		22	29
1150	247	17–18		23	30
1149	248	18–19		24	31
1148	249	**19–20**		25–26	32–33
1147	250	21–22		27	34
1146	251	22–23		28	35
1145	252	23–24		29	36
1144	253	24–25		30	37
1143	254	**25–26**		31–32	38–39
1142	255	27–28		33	40– **1** Abimelech.
1141	256	28–29		34	2
1140	257	29–30		35	**1**– 3 Tola.
1139	258	30–31		36	2
1138	259	**31–32**		37–38	3

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.			
			Scheme I.		Scheme II.	
1137	260	33–34		39	4	
1136	261	34–35		40– 1	5	
1135	262	35–36	Abimelech.	2	6	
1134	263	36–37		1– 3	7	
1133	264	**37–38**	Tola.	1– 2	8	
1132	265	39–40		3	9	
1131	266	40– 1		4	10	
1130	267	1– 2		5	11	
1129	268	2– 3		6	12	
1128	269	**3– 4**		7– 8	13	
1127	270	5– 6		9	14	
1126	271	6– 7		10	15	
1125	272	7– 8		11	16	
1124	273	8– 9		12	17	
1123	274	**9–10**		13–14	18	
1122	275	11–12		15	19	
1121	276	12–13		16	20	
1120	277	13–14		17	21	
1119	278	14–15		18	22	
1118	279	**15–16**		19–20	23– 1	Jair.
1117	280	17–18		21	2	
1116	281	18–19		22	3	
1115	282	19–20		23– 1	4	
1114	283	20–21	Jair.	1– 2	5	
1113	284	**21–22**		2– 3	6	
1112	285	23–24		4	7	
1111	286	24–25		5	8	
1110	287	25–26		6	9	
1109	288	26–27		7	10	
1108	289	**27–28**		8– 9	11	
1107	290	29–30		10	12	
1106	291	30–31		11	13	
1105	292	31–32		12	14	
1104	293	32–33		13	15	
1103	294	**33–34**		14–15	16	
1102	295	35–36		16	17	
1101	296	36–37		17	18	
1100	297	37–38		18	19	
1099	298	38–39		19	20	
1098	299	**39–40**		20–21	21	
1097	300	1– 2	Captivity to	22	22– 1	Captivity to
1096	301	2– 3	Philistia.		2	Philistia.
1095	302	3– 4			3	
1094	303	4– 5			4	
1093	304	**5– 6**			5	
1092	305	7– 8			6	
1091	306	8– 9			7	

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
1090	307	9–10		8
1089	308	10–11		9
1088	309	**11–12**		10
1087	310	13–14		11
1086	311	14–15		12
1085	312	15–16		13
1084	313	16–17		14
1083	314	**17–18**		15
1082	315	19–20		16
1081	316	20–21		17
1080	317	21–22		1–18 Jephthah.
1079	318	22–23		2
1078	319	**23–24**		3
1077	320	25–26		4
1076	321	26–27		5
1075	322	27–28		6– 1 Ibzan.
1074	323	28–29		2
1073	324	**29–30**		3
1072	325	31–32		4
1071	326	32–33		5
1070	327	33–34		6
1069	328	34–35		1– 7 Elon.
1068	329	**35–36**		2
1067	330	37–38		3
1066	331	38–39		4
1065	332	39–40		5
1064	333	40– 1		6
1063	334	**1– 2**		7
1062	335	3– 4		8
1061	336	4– 5		9
1060	337	5– 6		10– 1 Abdon.
1059	338	6– 7		2
1058	339	**7– 8**		3
1057	340	9–10		4
1056	341	10–11		5
1055	342	11–12		6
1054	343	12–13		7
1053	344	**13–14**	Samson.	1– 8 Captivity to
1052	345	15–16		2 Philistia.
1051	346	16–17		3
1050	347	17–18		4
1049	348	18–19		5
1048	349	**19–20**		6– 7
1047	350	21–22		8
1046	351	22–23		9
1045	352	23–24		10
1044	353	24–25		11

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
1043	354	**25-26**		12–13
1042	355	27–28		14
1041	356	28–29		15
1040	357	29–30		16
1039	358	30–31		17
1038	359	**31-32**		18–19
1037	360	33–34		20
1036	361	34–35		21
1035	362	35–36		22
1034	363	36–37		23
1033	364	**37–38**		24–25
1032	365	39–40		26
1031	366	40– 1		27
1030	367	1– 2		28
1029	368	2– 3		29
1028	369	**3– 4**		30–31
1027	370	5– 6		32
1026	371	6– 7		33
1025	372	7– 8		34
1025	373	8– 9		35
1024	374	**9-10**		36–37
1023	375	11–12		38
1022	376	12–13		39
1021	377	13–14		40– 1 Eli.
1020	378	14–15		1
1019	379	**15-16**		2– 3
1018	380	17–18		4
1017	381	18–19		5
1016	382	19–20		6
1015	383	20–21		7
1014	384	**21-22**		8– 9
1013	385	23–24		10
1012	386	24–25		11
1011	387	25–26		12
1010	388	26–27		13
1009	389	**27–28**		14–15
1008	390	29–30		16
1007	391	30–31		17
1006	392	31–32		18
1005	393	32–33		19
1004	394	**33–34**		20–21
1003	395	35–36		22
1002	396	36–37		23
1001	397	37–38		24
1000	398	38–39		25
999	399	**39–40**		26–27
998	400	1– 2		28

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
997	401	2– 3		29
996	402	3– 4		30
995	403	4– 5		31
994	404	**5– 6**		32–33
993	405	7– 8		34
992	406	8– 9		35
991	407	9–10		36
990	408	10–11		37
989	409	**11–12**		38–39
988	410	13–14		40– **1** Saul.
987	411	14–15		1
986	412	15–16		2
985	413	16–17		3
984	414	**17–18**		4– 5
983	415	19–20		6
982	416	20–21		7
981	417	21–22		8
980	418	22–23		9
979	419	**23–24**		10–11
978	420	25–26		12
977	421	26–27		13
976	422	27–28		14
975	423	28–29		15
974	424	**29–30**		16–17
973	425	31–32		18
972	426	32–33		19
971	427	33–34		20
970	428	34–35		21
969	429	**35–36**		22–23
968	430	37–38		24
967	431	38–39		25
966	432	39–40		26
965	433	40– 1		27
964	434	**1– 2**		28–29
963	435	3– 4		30
962	436	4– 5		31
961	437	5– 6		32
960	438	6– 7		33
959	439	**7– 8**		34–35
958	440	9–10		36
957	441	10–11		37
956	442	11–12		38
955	443	12–13		39
954	444	**13–14**		40– **1** David.
953	445	15–16		2
952	446	16–17		3
951	447	17–18		4

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronological Arrangement.	
			Scheme I.	Scheme II.
950	448	18–19		5
949	449	**19–20**		6– 7
948	450	21–22		8
947	451	22–23		9
946	452	23–24		10
945	453	24–25		11
944	454	**25–26**		12–13
943	455	27–28		14
942	456	28–29		15
941	457	29–30		16
940	458	30–31		17
939	459	**31–32**		18–19
938	460	33–34		20
937	461	34–35		21
936	462	35–36		22
935	463	36–37		23
934	464	**37–38**		24–25
933	465	39–40		26
932	466	40– 1		27
931	467	1– 2		28
930	468	2– 3		29
929	469	**3– 4**		30–31
928	470	5– 6		32
927	471	6– 7		33
926	472	7– 8		34
925	473	8– 9		35
924	474	**9–10**		36–37
923	475	11–12		38
922	476	12–13		39
921	477	13–14		40– 1 Solomon.
920	478	14–15		1
919	479	**15–16**		2– 3
918	480	17–18	Foundation of the	4
917	481	18–19	temple.	5
916	482	19–20		6
915	483	20–21		7
914	484	**21–22**		8– 9
913	485	23–24		10
912	486	24–25		11
911	487	25–26		12
910	488	26–27		13
909	489	**27–28**		14–15
908	490	29–30		16
907	491	30–31		17
906	492	31–32		18
905	493	32–33		19
904	494	**33–34**		20–21

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Cycles of Forty Decimestrial Years.	Chronolooical Arrangement.	
			Scheme I.	Scheme II.
903	495	35–36		22
902	496	36–37		23
901	497	37–38		24
900	498	38–39		25
899	499	**39–40**		26–27
898	500	1– 2		28
897	501	2– 3		29
896	502	3– 4		30
895	503	4– 5		31
894	504	**5– 6**		32–33
893	505	7– 8		34
892	506	8– 9		35
891	507	9–10		36
890	508	10–11		37
889	509	**11–12**		38–39
888	510	13		40

A few explanations may make clear this table. It displays two schemes of the chronology from the exodus down to the captivity to Philistia, B.C. 1097, where the two coincide. Scheme I. reckons the wanderings in the wilderness as in years of twelve months. Scheme II. reckons these as in years of ten months. Scheme I. places the division of lands in the forty-seventh year of the exodus (twelve months). Scheme II. places the division of lands in the forty-seventh year of the exodus (ten months). Scheme I. places the captivity to Mesopotamia in B.C. 1350, and Scheme II. terminates that captivity in that year. Scheme I. reckons all the items of forty years beginning with that of the judgeship of Othniel as of years of ten months, also the judgeships of Tola, twenty-three years, and Jair, twenty-two years, are so reckoned. It is believed that the three items beginning with Tola and ending with the captivity to Philistia, eighteen years, may denote so many cycles of the return of the same eclipses; that is, fifty-four years, the first two of which are in decimestrial years. Scheme II. reckons the period down to the captivity of Mesopotamia in decimestrial years; also all items of forty years as ten-month years. All other items in both

schemes are in years of twelve months. The decimestrial year is in cycles of six years, equal to five of twelve months. For every five years counted from the era they fall as in the following table:

Years of Twelve Months.	Decimestrial Years in Months.
1	(Year 1) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, (Year 2) 11, 12,
2	1, 2, 3, 4, 5, 6, 7, 8, (Year 3) 9, 10, 11, 12,
3	1, 2, 3, 4, 5, 6, (Year 4) 7, 8, 9, 10, 11, 12,
4	1, 2, 3, 4, (Year 5) 5, 6, 7, 8, 9, 10, 11, 12,
5	1, 2, (Year 6) 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

The chronological table gives every year of each ruler, and captivity, which causes the last year of a preceding item to overlap the first year of a succeeding one. The decimestrial years follow the Jewish vague year, which in B.C. 1397 began on April 2, the day of the vernal equinox. Only nine months and five days of the Jewish vague year fell in B.C. 1397, hence the first decimestrial year fell partly in B.C. 1396. The table does not show this, but simply designates the decimestrial years corresponding to the vague years as found in the column headed Era of Tabernacle. The Julian epochs in the first column are only for the beginning of the vague year.

The astronomical knowledge of the Jews fully equalled that of the same class in the surrounding nations. I am aware the opposite of this opinion is held. Special mention of astronomical matters are absent from the Bible. There are found only a few allusions to this subject, made in a more or less obscure way; but these, when given the consideration due them, point to a not inferior knowledge of these matters. The Jews possessed truer knowledge of the length of the solar year than that usually ascribed to the ancients, and it is proposed to be made evident, in the course of this work, that they were not only acquainted with the sidereal cycle, the knowledge of which is generally accredited to the Egyptians, but also that their knowledge of eclipses and their chronological use was fully up to that of the world-famed Chaldean.

In the review just made of the ordinances establishing the great historical festivals, there was found in connection with them no direct intimation of the time of the year at which the exodus took place, or any allusion to the place of the moon at the time of that event. That the event took place about the

time of the vernal equinox is agreeable to tradition. This is also implied in the Bible. In I. Chronicles xii. 15 occurs, "These are they that went over Jordan in the first month, when it had overflown all its banks; and they put to flight all them of the valleys, both toward the east, and toward the west." In Judea the former rains fall in October and November; the latter rains in March and April. "It is owing to these latter rains that Jordan in the first month annually overflows its banks at the season of barley harvest; and the reason why it overflows them only once in the year is, that when the former rains fell the ground was so parched by the summer's drought that they scarcely quenched its thirst, but having been saturated at times with plentiful showers during the winter, those surplus portions of the latter rain which fall in the spring naturally empty themselves into the river, and carry it along at full flood."* The passage of the Jordan alluded to in I. Chronicles was on the tenth day of the first month. This implies the Lord's passover was about at the time of the vernal equinox.

I have been led by many considerations, which from time to time will be unfolded in the course of this inquiry, to regard the vague year as the chronological year of the Jews. While holding this view, I do not intend thereby to advocate the exclusion of other forms of years for other purposes, or for the same purpose at other times. According to my reckoning, from the exodus to the end of the Babylonian captivity was a period of nine hundred years. This many tropical years are exactly seven days shorter than the same number of Julian years, and two hundred and eighteen days longer than a like number of vague years. So it is a matter of no great moment whether the chronological year be a vague, a tropical, or a Julian year. The tables will not differ more than one year if any of these years are used. But if it can be shown that, by the use of the vague year for this purpose, certain events connected with astronomical phenomena, widely separated by years, are brought to the month, and even the day of the month, in which they may be believed to have happened, it is certainly in favor of the vague year. This I propose to do.

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* "Antiquities of the Jews" (William Brown), vol. ii. pp. 432, 433.

The epoch of the exodus was the beginning of the Jewish nation. It had the essential political elements, but the old chronological systems required, in addition, that there should be in connection with the method of measuring time a proper astronomical beginning. The epoch was often marked by the erection of a monument or temple of stone with a suitable inscription as a memorial. This was not always done, circumstances and emergencies preventing or producing some other way of accomplishing the same result. In the case of the Jews the feasts of unleavened bread and tabernacles are ordered to be observed as memorials of their coming out of Egypt. If the political epoch was unaccompanied with phenomena proper to a new beginning, the chronologer would, while reckoning from the political epoch, conform the year to the condition of things existing at another time, because, as they governed the measurement of time by observation of the celestial bodies, these must have their influence upon the year. In this way there will be two or more epochs: one kind political, by which will be reckoned the number of years, and the other astronomical, by which the years will be begun. A case in point, to illustrate two epochs in connection with one reckoning of years, is the celebrated era of the battle of Actium. This era began with the 1st of Thoth; the battle was fought on the 2d of September, but the legal 1st of Thoth in connection with the era fell on the 29th of August.

The epoch of the exodus is in dispute. There are those who affirm that the older Jews never had a chronological epoch. The only recognized instance of such a thing, they claim, is found in connection with the foundation of Solomon's temple in the four hundred and eightieth year after the exodus. But this statement in I. Kings is not universally admitted to have belonged to the original record, some claiming it to be the computation of a *rédacteur*. The expression "Exodus of the Jews" properly covers all the period of their journeying previous to their settlement upon their lands. But it is not always synonymous with other expressions used; that is, it does not have the same limitations. Indeed, it is a question what time is meant by the phrase in I. Kings vi. 1, "the four hundred and eightieth year after the children of Israel were come out of the

land of Egypt." The Samaritan version of the Bible differs from the Hebrew in the year of the foundation of Solomon's temple, giving for that year 440 instead of 480. This would seem to imply that whoever inserted 440 into that text counted the time from the crossing of Jordan, regarding all previous to that as still passed in Egypt. In favor of such a view, we might well inquire upon what grounds are based our notions of the boundaries of ancient Egypt. At the close of the twelfth dynasty, "The domination of the Egyptian sceptre was vigorously maintained in the peninsula of Sinai. Officials of the king, supported by a large military force, maintained the Pharaonic sovereignty in the mountains of the land of Mafkat."* In the time of Rameses III. we find that "distinguished officials went thither on the king's commission, to bring to the treasuries of Pharaoh the much-prized greenish-blue copper-stone [Mafka turquoises?]."† It is from the gloomy recesses of Sinai, and in the vast wilderness of Paran that the children of Israel disappear from view to emerge in the fortieth year, and cross the brook Zered thirty-eight years after their departure from Kadesh-barnea. Further, the writer of the number 480, having in mind the foundation of Solomon's temple, may have reckoned from the epoch of the raising of the tabernacle, to take the place of which Solomon's temple was built. I propose to consider this year, the four hundred and eightieth, to be counted from the era of the tabernacle. The tabernacle was reared up "in the first month in the second year, on the first day of the month." The era begins with the second year of the Lord's passover in Egypt, and the years reckoned from it will be one less than those counted from the era of the passover. The year of the foundation of Solomon's temple is the four hundred and eightieth of the era of the tabernacle, the four hundred and eighty-first of the era of the passover, and the four hundred and eightieth after the children of Israel were come out of Egypt, for "on the twentieth day of the second month, in the second year, that the cloud was taken up from off the tabernacle of the testimony. And the children of Israel took their jour-

* "Egypt under the Pharaohs" (Brugsch), vol. i. chap. ix. p. 174. Eng. trans.

† Ibid., vol. ii. chap. xv. p. 143. Eng. trans.

neys out of the wilderness of Sinai; and the cloud rested in the wilderness of Paran."

There are several times in the first forty-eight years of the history suitable for eras. The following will be noticed: The eras of the passover and the tabernacle; the epochs of the departure from Sinai, of Othniel, and the foundation of Solomon's temple. In choosing eras connected with the exodus, the fixed dates of the Jewish festivals should fall naturally in their places. The holy days of these feasts were the 10th, 15th, and 21st of the month, which were to be observed as memorials of their coming out of Egypt. If the practice was to erect monuments of stone to commemorate an important event, giving also some indication of the time, in order to establish such as memorials of epochs, then, in the case of the Jews, who followed a different way of accomplishing the same end, the dates of these feasts refer to epochs or eras. The distinction which has been made between the political and technical or astronomical epoch applies also here, and it is the object to discover which of these dates refers particularly to some technical epoch, or whether the Jewish political and technical epochs were in any case identical. If the numbers refer to dates of the vernal equinox and autumnal equinox, and places of the moon, the historical epochs should be such as to allow the phenomena to fall on the dates to which they refer.

EPOCH OF THE PASSOVER.

In the year B.C. 1397 the vernal equinox was on the 2d of April; this was also the 2d of the Egyptian month Pachons. If Abib, the first month, in this year is made to begin at the vernal equinox, then the Jewish year is placed in relation to the Julian, which permits, on the assumption that the year was a vague one, the discovery of the astronomical character of the great historical dates. It must be kept in mind that the Roman and Egyptian day began at midnight, and the Jewish day at sunset. The following will be the condition of the three years in B.C. 1397:

B.C. 1397, Julian	year,	vernal equinox	April 2,	full moon	April 21.
" Egyptian	"	"	Pachons 2,	"	Pachons 21.
" Jewish	"	"	Abib 1,	"	Abib 20.

At even of the 20th day the moon was full.

EPOCH OF THE TABERNACLE.

B.C. 1396, Julian	year,	vernal equinox	April 2,	full moon	April 11.
" Egyptian	"	"	Pachons 2,	"	Pachons 11.
" Jewish	"	"	Abib 1,	"	Abib 10.

The tabernacle was set up on the first day of the first month of the second year, which was the day of the vernal equinox, and the full moon was on the 10th of Abib, the date of the day of the selection of the paschal lamb.

Two schemes for the epochs of the crossing of the Jordan and the judgeship of Othniel:

Scheme I.	*Scheme II.*
Crossing of Jordan, B.C. 1357.	Crossing of Jordan, B.C. 1364.
Epoch of Othniel, " 1343.	Epoch of Othniel, " 1350.

Scheme I.—Crossing of the Jordan, B.C. 1357.

B.C. 1357, Julian	year,	vernal equinox	April 2,	new moon	April 14.
" Egyptian	"	"	Pachons 12,	"	Pachons 24.
" Jewish	"	"	Abib 11,	"	Abib 23.

EPOCH OF OTHNIEL, B.C. 1343.

B.C. 1343, Julian	year, autumnal	equinox	October 6.
" Egyptian	" "	"	Athyr 17.
" Jewish	" "	"	Ethanim 16.

Scheme II.—This reckons the forty years from the era of the passover in decimestrial years.

EPOCH OF THE CROSSING OF THE JORDAN, B.C. 1364.

B.C. 1364, vernal	equinox	April 2,	visible new	moon	April 3.
" "		Pachons 10,	" "		Pachons 11.
" "		Abib 9	" "		Abib 10.

The Jordan was crossed on the day of the visible new moon, Abib 10, the day following the vernal equinox.*

EPOCH OF OTHNIEL, B.C. 1350.

B.C. 1350, autumnal	equinox	October 7,	full	moon	October 7.
" "	"	Athyr 16,	"		Athyr 16.
" "	"	Ethanim 15,	"		Ethanim 15.

The year of Othniel began with the seventh month of the forty-eighth year of the exodus, which in B.C. 1350 had the full moon on the 15th of Ethanim, the day of the autumnal equinox.

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* See Joshua iv. 19, for date of the passage of the Jordan.

The following sets forth in one view the results so far obtained:

Epoch of Exodus B.C. 1397, vernal equinox Abib 1, full moon Abib 21.
" Tabernacle " 1396, " " 1, " " 10.

Scheme I.

Epoch of Crossing of Jordan B.C. 1357, vernal equinox Abib 11, new moon Abib 23.
" Othniel " 1343, autumnal equinox Ethanim 16.

Scheme II.

Epoch of Crossing of Jordan B.C. 1364, vernal equinox Abib 9, visible new moon Abib 10.
" Othniel " 1350, autumnal equinox Ethanim 15, full moon Ethanim 15.

In all of these cases, except those of Scheme I. for the crossing of the Jordan and the epoch of Othniel, dates connected with the two great historical festivals of the Jews are found for the epochs taken to have specific astronomical phenomena of the solar and lunar years. It is probable that the Jews at this time had a lunar month with the visible new moon on the 1st of the month. It is possible the vague and the lunar months bore the same names, the lunar Abib commencing with the visible new moon of the vague Abib. This would intercalate the lunar year with an additional month of the same name whenever there were two visible new moons in any one vague month.

Hebrew scholars have explained the names Abib, first month; Zif, second month; Ethanim, seventh month; Bul, eighth month, as referring to seasons or fixed times of the year. Contrary to the received opinion, it has been proposed to derive Abib from the Egyptian month Epiphi, but there is no ground for this unless the exodus is to be put at a much later period; that is, about B.C. 1157, or later, if the vernal equinox is to fall in the month Epiphi. The same objection does not apply to a common derivation of the corresponding months Athyr and Ethanim. Not only do they resemble each other in their formation, but, independently of this, they are connected with the same things. "The third Egyptian month was called after Athor, in which the death of Osiris was fabled to have happened; and it was at this season that the shrines of the goddess (Ceres or Isis) were carried in procession, 'the common time,' says Plutarch, 'for the solemnization of the feasts in her honor falling within the

months in which the Pleiades appear, and the husbandmen begin to sow their corn, called by the Egyptians Athyr.'" * Ethanim is also the month in which ploughing and sowing begin.

The following table will be of use to find corresponding dates of the Egyptian and Jewish vague years. It conforms to the preceding calculations. The Jewish day begins at sunset, and Jewish dates concur in part with two dates of the Egyptian year. The intercalary days are added to the sixth month of the Jewish year, while they follow the twelfth month of the Egyptian year. The table gives the dates corresponding to the 1st of each month of the Jewish year. In applying this table I have followed only the concurrence of the *last* Egyptian date,—that is, *1st of Abib = 2d Pachons.*

Jewish Dates.			Egyptian Dates.	
1st of	first month	=	1st–2d	Pachons.
"	second "	=	"	Payni.
"	third "	=	"	Epiphi.
"	fourth "	=	"	Mesori.
"	fifth "	=	"	Intercalary days.
"	sixth "	=	26th–27th	Thoth.
"	seventh "	=	1st–2d	Athyr.
"	eighth "	=	"	Khoiakh.
"	ninth "	=	"	Tybi.
"	tenth "	=	"	Mechir.
"	eleventh "	=	"	Phamenoth.
"	twelfth "	=	"	Pharmuthi.

It was shown that by bringing the 1st of Abib to the vernal equinox, in B.C. 1397, the fixed dates of the great festivals of the Jewish religion found suitable astronomical phenomena in the several years taken as Jewish epochs. These epochs may be used as eras in the technical sense. By inspection of the chronological table, it will be seen there is not an unbroken series of eponymous cycles from Othniel to Solomon. The series is scarcely begun when it ceases with the captivity of Moab. Ehud begins another series, and this lasts for only two cycles, when the captivity of Jabin puts it to an end. Deborah and Barak begin another, which is also broken by a captivity. Gideon begins another, but it is not continued. The system is abandoned, and does not appear again until perhaps Samson

* "The Ancient Egyptians" (Wilkinson), vol. iii. p. 116.

became eponym, for he judged Israel twenty years in the time of the Philistines. This last captivity was for forty years. But with Eli a series begins which is continued unbroken down to Rehoboam. From the character of these cycles, for they imply an autonomy at their institution, the result is what must have happened. They would naturally be terminated when the nation was subjugated and deprived of its legitimate rulers. But this is not the only cause of their suppression. During this portion of Jewish history, and secondary to the cause just mentioned, the civil and religious polity of the nation was in a disturbed state. By contact with other peoples they became contaminated with religions other than the pure worship of Jehovah. These affected their methods of measuring time. The ritual of a religion conforms to the time-measurement in use. This is true of the Jews as well as of all other nations. This may explain why the judges, beginning with Abimelech and ending with Abdon, had abandoned the former form of the year by the cycle, and taken up with one of twelve months. Othniel begins his cycle with the seventh month, and the full moon on the fifteenth day, which was also the day of the autumnal equinox. Eli also begins his cycle with the seventh month. In B.C. 1021 the full moon was on July 2, the day of the summer solstice; this date concurred with Athyr 2 and Ethanim 1. The new moon was on July 17, Athyr 17, and Ethanim 16. July 17 was the date of the heliacal rising of Sirius on the day of the new moon following the summer solstice. The series of eponymous cycles beginning with that of Eli have suitable astronomical phenomena at the beginning. It would seem that a lunar vague year, rather than the common year, was used. But it is not necessary to suppose the practice was confined to this form. The cycles in this and the subsequent table of Part II. are all in connection with the vague year, using months of thirty days, with five intercalary days; and as both forms were used, a slight variation, not amounting to a year, may more correctly show the true state of the case than the one followed.

EPOCH OF THE FOUNDATION OF SOLOMON'S TEMPLE.

The era of the tabernacle was placed in B.C. 1396. The tabernacle was set up in the first day of the first month. The

children of Israel took their journey out of the wilderness of Sinai in the 20th of the second month. This date, the 20th of the second month, was the coming out of Egypt alluded to in the statement of I. Kings vi. 1. In the four hundred and eightieth year after the children of Israel were come out of Egypt, in the fourth year of his reign, in the second month Zif, Solomon began to build the house of the Lord. In the table the fourth year of Solomon and the four hundred and eightieth year of the tabernacle began in B.C. 918. If the foundation of Solomon's temple was on the 20th of the second month, the date of the departure from Sinai, it is brought exactly to the beginning of the four hundred and eightieth year of the coming out of the children of Israel. Further, if the foundation of the temple was on the day of the new moon, the new moon will be on this date. If the chronological arrangement is correct, such might be expected to be the case, because this practice was customary among the ancients, and there is no reason to suppose the Jews exceptional in this instance, when they had so many customs of this kind in common with other nations. In B.C. 918 the new moon was on the 22d of January, concurrent with the 21st of Payni. In this year the 20th of the second month, Zif, concurred with the 21st of Payni. This brings the new moon to that date. Following the fashion of giving these dates with the day of the week, it may be fairly concluded that Solomon's temple was founded on Saturday, the 22d of January, B.C. 918.

CHAPTER XIII.

THE HISTORICAL CHRONOLOGY OF THE JEWS (CONTINUED).

PART II.

FROM THE FIRST YEARS OF THE REIGNS OF REHOBOAM AND JEROBOAM I.

THE problem connected with the synchronous histories of Judah and Israel may be described as follows: Let a list of the kings of Judah be arranged in a column parallel with another of the kings of Israel, the reigns of each being numbered year

by year, and make the first years of the kings of Judah to fall on the same line with the years of the kings of Israel, in which they are said to have begun to reign, and do the same for the kings of Israel in the line of Judah. The two lines run parallel from the first of Jeroboam I. to the final year of Hoshea, the last king of the ten tribes, which synchronizes with the sixth year of Hezekiah, king of Judah. It will be observed, the line of Israel is shorter than the line of Judah for the same period; in each line there are many cases of overlappings of one or more years of the last part of a king's reign with the first of his successor, this being true of Israel, although its line is apparently too short. In Judah between Amaziah and Azariah there is an interval of eleven years, which is not occupied by the reign of any king, and in Israel there are three such gaps, one of twenty-two years between Jeroboam II. and Zachariah, one of one year between Menahem and Pekahiah, and one of seven years between Pekah and Hoshea. The overlaps are explained by commentators in two ways. First, in the old chronological lists, the custom was to count the years of a king's reign by the number of years in which he held authority. This practice is admissible when the exact date of the beginning and end of a reign has not been retained. This will account for the overlapping in many instances of the first year of a reign with the last year of its predecessor, such years being common to both, and are only counted once in the chronological tables. Second, in the case where the overlaps are for several years, these are explained to be joint reigns; the son or successor of a king being joined in authority with his predecessor for that much time.

Unless there is something in the historical account to clearly countenance the hypothesis of a double reign, such an explanation has no other merit than that it may serve for want of a better. The gaps in the line of Judah and Israel are explained to be interregna. This is done, although the historical account makes no mention of them, and the impression left after its perusal is, these kings succeeded each other without any separation at all. The existence of these is only discovered when a chronological table of the reigns of the kings of Judah and Israel is attempted.

Chronological Data of the Reigns of the Kings of Judah and Israel.

Rehoboam reigned seventeen years	I. Kings	xiv. 21.
Jeroboam I. reigned twenty-two years	"	xiv. 20.
Abijam, king of Judah, began in the eighteenth year of Jeroboam I., and reigned three years	"	xv. 1, 2.
Asa, king of Judah, began in the twentieth year of Jeroboam I., and reigned forty-one years	"	xv. 9, 10.
Nadab, king of Israel, began in the second year of Asa, and reigned two years	"	xv. 25.
Baasha, king of Israel, began in the third year of Asa. He reigned twenty-four years	"	xv. 33.
Elah began in the twenty-sixth year of Asa. He reigned over Israel two years	"	xvi. 8.
Zimri began in the twenth-seventh year of Asa. He reigned over Israel seven days	"	xvi. 15.
Omri began in the thirty-first year of Asa to reign over Israel. He reigned in Tirzah six years. He reigned twelve years	"	xvi. 23.
Ahab began to reign over Israel in the thirty-eighth year of Asa. He reigned twenty-two years	"	xvi. 29.
Jehoshaphat began to reign over Judah in the fourth year of Ahab. He reigned twenty-five years	"	xxii. 41, 42.
Ahaziah began to reign over Israel in the seventeenth year of Jehoshaphat. He reigned two years	"	xxii. 51.
Jehoram began to reign over Israel in the eighteenth year of Jehoshaphat. He reigned twelve years	II. Kings	iii. 1.
Jehoram, the son of Jehoshaphat, his father being then king, began to reign over Judah. He reigned eight years	"	viii. 16, 17.
Ahaziah began to reign over Judah in the twelfth year of Joram of Israel. He reigned one year	"	viii. 25, 26.
Ahaziah began to reign over Judah in the eleventh year of Joram	"	ix. 29.
Jehu reigned twenty-eight years	"	x. 36.
Athaliah reigned over Judah six years	"	xi. 3.
Jehoash began in the seventh year of Jehu. He reigned forty years over Judah	"	xii. 1.
Jehoahaz began to reign over Israel in the twenty-third year of Jehoash. He reigned seventeen years	"	xiii. 1.

Jehoash began to reign over Israel in the thirty-seventh year of Jehoash of Judah. He reigned sixteen years	II. Kings	xiii. 10.
Amaziah began to reign over Judah in the second year of Jehoash of Israel. He reigned twenty-nine years	"	xiv. 1, 2.
Jeroboam II. began to reign over Israel in the fifteenth year of Amaziah. He reigned forty-one years	"	xiv. 23.
Azariah began to reign over Judah in the twenty-seventh year of Jeroboam II. He reigned fifty-two years	"	xv. 1, 2.
Zachariah began to reign over Israel in the thirty-eighth year of Azariah. He reigned six months	"	xv. 8.
Shallum began in the thirty-ninth year of Azariah. He reigned over Israel one month	"	xv. 13.
Menahem began in the thirty-ninth year of Azariah. He reigned over Israel ten years	"	xv. 17.
Pekahiah began to reign over Israel in the fiftieth year of Azariah. He reigned two years	"	xv. 23.
Pekah began to reign over Israel in the fifty-second year of Azariah. He reigned twenty years	"	xv. 27.
Jotham began to reign over Judah in the second year of Pekah. He reigned sixteen years	"	xv. 32, 33.
Ahaz began to reign over Judah in the seventeenth year of Pekah. He reigned sixteen years	"	xvi. 1, 2.
Hoshea began to reign over Israel in the twelfth year of Ahaz. He reigned nine years	"	xvii. 1.
Hezekiah began to reign over Judah in the third year of Hoshea. He reigned twenty-nine years	"	xviii. 1, 2.
The fourth of Hezekiah is the seventh of Hoshea	"	xviii. 9.
At the end of three years, in the sixth of Hezekiah and the ninth of Hoshea, Samaria was taken	"	xviii. 10.
Manasseh reigned over Judah fifty-five years	"	xxi. 1.
Amon " " " two years	"	xxi. 19.
Josiah " " " thirty-one years	"	xxii. 1.
Jehoahaz " " " three months	"	xxiii. 31.
Jehoiakim " " " eleven years	"	xxiii. 36.
Jehoiachin " " " three months	"	xxiv. 8.
Zedekiah " " " eleven years	"	xxiv. 18.

The remaining data upon which the chronology is founded are considered in the synchronous histories of Babylon and Persia, and matters connected therewith.

Chronological Table

FROM THE FIRST YEARS OF REHOBOAM AND JEROBOAM DOWN TO THE COMPLETION OF THE SECOND TEMPLE IN THE SIXTH YEAR OF DARIUS NOTHUS, B.C. 419.

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.	Kings of Israel.	Cycles of Eclipses.	
888	510	0	13	1	1		
887	511	1	14	Rehoboam. 1	Jeroboam I. 1		
886	512	2	15	2	2		
885	513	3	16	3	3	Jeroboam I. 1	Institution of the Apis-worship by Jeroboam.
884	514	4	17-18	4-5	4-5-6	2	
883	515	5	19	6	6	3	
882	516	6	20	7	7	4	
881	517	7	21	8	8	5	
880	518	8	22	9	9	6	
879	519	9	23-24	10-11	10-11-12	7	
878	520	10	25	12	12	8	
877	521	11	26	13	13	9	
876	522	12	27	14	14	10	
875	523	13	28	15	15	11	
874	524	14	29-30	16-17	16-17-18	12	
				Abijam.			
873	525	15	31	**1**	**18**	13	
872	526	16	32	2-3	19	14	
				Asa.			
871	527	17	33	**1**	**20**	15	
					Nadab.		
870	528	18	34	**2**	21-1-2	16	
					Baasha.		
869	529	19	35-36	3-4	2-1-2-3	17	
868	530	20	37	5	3	18	
867	531	21	38	6	4	19	
866	532	22	39	7	5	20	
865	533	23	40	8	6	21	
864	534	24	1-2	9-10	7-8-9	22	
863	535	25	3	11	9	23	
862	536	26	4	12	10	24	
861	537	27	5	13	11	25	
860	538	28	6	14	12	26	
859	539	29	7-8	15-16	13-14-15	27	
858	540	30	9	17	15	28	
857	541	31	10	18	16	29	
856	542	32	11	19	17	30	
855	543	33	12	20	18	31	
854	544	34	13-14	21-22	19-20-21	32	
853	545	35	15	23	21	33	
852	546	36	16	24	22	34	
851	547	37	17	25	23	35	
					Elah.		
850	548	38	18	**26**	24-1-2	36	
					Zimri 1.	Omri.	
849	549	39	19-20	27-28	2-1-2-3	**1**	

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.	Kings of Israel.	Cycles of Eclipses.	Kings of Assyria.
848	550	40	21	29	3	2	
847	551	41	22	30	4	3	
846	552	42	23	**31**	5	4	
845	553	43	24	32	6	5	
844	554	44	25-26	33-34	7-8-9	6	
843	555	45	27	35	9	7	
842	556	46	28	36	10	8	
841	557	47	29	37	11	9	
840	558	48	30	**38**	12-1	10	1
839	559	49	31-32	39-40	1-2-3	11	2
838	560	50	33	41-1	3-4	12	3
837	561	51	34	1	4	13	4
836	562	52	35	2	5	14	5
835	563	53	36	3	6	15	6
834	564	54	37-38	4-5	7-8-9	16	7
833	565	55	39	6	9	17	8
832	566	56	40	7	10	18	9
831	567	57	1	8	11	19	10
830	568	58	2	9	12	20	11
829	569	59	3-4	10-11	13-14-15	21	12
828	570	60	5	12	15	22	13
827	571	61	6	13	16	23	14
826	572	62	7	14	17	24	15
825	573	63	8	15	18	25	16
824	574	64	9-10	16-**17**	Ahaziah 1. 19-20-21	26	17
823	575	65	11	**18**	2-**1**	27	18
822	576	66	12	19	**1**	28	19
821	577	67	13	20	2	29	20
820	578	68	14	21	**3**	30	21
819	579	69	15-16	**1**-22-23	4-5-6	31	22
818	580	70	17	2-24	6	32	23
817	581	71	18	3-25	7	33	24
816	582	72	19	4	8	34	25
815	583	73	20	5	9	35	26
814	584	74	21-22	6-7	10-11-12	36	27

Kings of Israel.			Cycles of Eclipses.	Kings of Assyria.
Old Series.	New Series.			
10 mos.	12 mos.	10 mos.		
1-12	**1**	1	**1**	28
1	2	1	2	29
2	3	2	3	30
3	4	3	4	31
4-5-6	5	4-5-6	5	32
6-**7**	6	6	6	33
8	7	7	7	34
9	8	8	8	35
10-11-12	9	9	9	1
12	10	10-11-12	10	2
	11	12	11	3

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.
813	585	75	23	**8-1** Athaliah.
812	586	76	24	2
811	587	77	25	3
810	588	78	26	4
809	589	79	27-28	5
808	590	80	29	**1**-6
807	591	81	30	2
806	592	82	31	3
805	593	83	32	4
804	594	84	33-34	5-6
803	595	85	35	7

Azariah. Jehoash.

Shalmaneser II. Vul-lush-i-sarus.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.	Kings of Israel. Old Series. 10 mos.	Kings of Israel. New Series. 12 mos.	Kings of Israel. New Series. 10 mos.	Cycles of Eclipses.	Kings of Assyria.
802	596	86	36	8	13	12	13	12	4
801	597	87	37	9	14	13	14	13	5
800	598	88	38	10	15	14	15	14	6
799	599	89	39–40	11–12	16–17–18	15	16–17–18	15	7
798	600	90	1	13	18	16	18	16	8
797	601	91	2	14	19	17	19	17	9
796	602	92	3	15	20	18	20	18	10
795	603	93	4	16	21	19	21	19	11
794	604	94	5– 6	17–18	22–23–24	20	22–23–24	20	12
793	605	95	7	19	24	21	24	21	13
792	606	96	8	20	25	22	25	22	1
791	607	97	9	21	26	23	26	23	2
790	608	98	10	22	27–28	24	27	24	3
789	609	99	11–12	23–24	1–2–3	25	28–29–30	25	4
788	610	100	13	25	3	26	30	26	5
787	611	101	14	26	4	27	31	27	6
786	612	102	15	27	5	28	32	28	7
785	613	103	16	28	6	1	33– 1	29	8
784	614	104	17–18	29–30	7–8–9	2	1–2–3	30	9
783	615	105	19	31	9	3	3	31	10
782	616	106	20	32	10	4	4	32	11
781	617	107	21	33	11	5	5	33	12
780	618	108	22	34	12	6	6	34	13
779	619	109	23–24	35–36	13–14–15	7	7–8–9	35	14
778	620	110	25	37	15	8	9	36	15
777	621	111	26	38	16–17–1	9	10	1	16
776	622	112	27	39–40	1	10	11	2	17
775	623	113	28	1	2	11	12	3	18
774	624	114	29–30	2	3–4–5	12	13–14–15	4	19
773	625	115	31	3	5	13	15	5	20
772	626	116	32	4	6	14	16	6	21
771	627	117	33	5	7	15	17	7	22
770	628	118	34	6	8	16	18	8	23
769	629	119	35–36	7– 8	9–10–11	17	19–20	9	24
768	630	120	37	9	11	1	1	10	25
767	631	121	38	10	12	2	2	11	26
766	632	122	39	11	13	3	3	12	27
765	633	123	40	12	14	4	4	13	28
764	634	124	1– 2	13–14	15–16	5	5–6–7	14	29
763	635	125	3	15	1	6	7	15	1
762	636	126	4	16	2	7	8	16	2
761	637	127	5	17	3	8	9	17	3
760	638	128	6	18	4	9	10	18	4
759	639	129	7– 8	19–20	5–6–7	10	11–12–13	19	5
758	640	130	9	21	7	11	13	20	6
757	641	131	10	22	8	12	14	21	7
756	642	132	11	23	9	13	15	22	8
755	643	133	12	24	10	14	16	23	9
754	644	134	13–14	25–26	11–12–13	15	17–18–19	24	10
753	645	135	15	27	13	16	19	25	1
752	646	136	16	28	14	1	20– 1	26	2
751	647	137	17	29– 1	15	2	1	27	3
750	648	138	18	1	16	3	2	28	4
749	649	139	19–20	2– 3	17–18–19	4	3–4–5	29	5
748	650	140	21	4	19	5	5	30	6
747	651	141	22	5	20	6	6	31	7
746	652	142	23	6	21	7	7	32	8
745	653	143	24	7	22	8	8	33	9
744	654	144	25–26	8– 9	23–24–25	9	9–10–11	34	10
743	655	145	27	10	25	10	11	35	11

Jehoash. Amaziah. Jeroboam II. Azariah. Jehoahaz. Jehoahaz. Jehoash. Jeroboam II. Jeroboam II. Samsi-Avul. Vul-nirari. Shalmaneser III. Assur-danu.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decemestrial Years.	Kings of Judah.	Kings of Israel.			Cycles of Eclipses.	Kings of Assyria.	Kings of Babylon.
					Old Series.	New Series.				
					10 mos.	12 mos.	10 mos.			
742	656	146	28	11	26	11	12	36	12	
741	657	147	29	12	27	12	13	Azariah. 1	13	
740	658	148	30	13	28	13	14	2	14	
739	659	149	31-32	14-15	29-30-31	14	15-16-17	3	15	
738	660	150	33	16	32	15	17	4	16	
737	661	151	34	17	33	16	18	5	17	
736	662	152	35	18	34	17	19	6	18	
735	663	153	36	19	35	18	20	7	1	
734	664	154	37-38	20-21	36-37-38	19	21-22-23	8	2	
733	665	155	39	22	38	20	23	9	3	
732	666	156	40	23	39	21	24	10	4	
731	667	157	1	24	40	22	25	11	5	
730	668	158	2	25	41	23	26	12	6	
729	669	159	3- 4	26-27		24	27-28-29	13	7	
728	670	160	5	28		25	29	14	8	1
727	671	161	6	29		26	30	15	9	2
726	672	162	7	30		27	31	16	1	3
725	673	163	8	31		28	32	17	2	4
724	674	164	9-10	32-33		29	33-34-35	18	3	5
723	675	165	11	34		30	35	19	4	6
722	676	166	12	35		31	36	20	5	7
721	677	167	13	36		32	37	21	6	8
720	678	168	14	37		33	38	22	7	9
719	679	169	15-16	38-39		1	39-40	23	8	10
718	680	170	17	40		Menahem. 2	Zachariah 1.	24	9	11
717	681	171	18	41		3		25	10	12
716	682	172	19	42		4	Shallum 1.	26	11	13
715	683	173	20	43		5		27	12	14

				Kings of Judah.		Kings of Israel.					
				10 mos.	12 mos.	10 mos.	12 mos.				
714	684	174	21-22	44-45			Menahem. 6	28	13	Nadios.	1
713	685	175	23	46			7	29	14	Khiniros.	2
712	686	176	24	47			8	30	15	Porios.	1
711	687	177	25	48			9	31	16	Ilouaios.	2
710	688	178	26	49-50			Pekahiah. 1-10	32	17	Mardokempados.	3
709	689	179	27-28	50-51			2	33	18		1
708	690	180	29	52- 1	1	1-2	1	34	19	Shalmaneser IV.	2
707	691	181	30	1	2	2	2	35	1		1
706	692	182	31	2	3	3	Pekah. 3	36	1		2
705	693	183	32	3	4	4	4	1	2		3
704	694	184	33-34	4- 5	5	5-6-7	5	2	3	Sargon.	4
703	695	185	35	6	6	7	6	3	4		5
702	696	186	36	7	7	8	7	4	5		1
701	697	187	37	8	8	9	8	5	6		2
700	698	188	38	9	9	10	9	6	7		3
699	699	189	39-10	10-11	10	11-12-13	10	7	8		4
698	700	190	1	12	11	13	11	8	9		5
697	701	191	2	13	12	14	12	9	10		6
696	702	192	3	14	13	15	13	10	1		7
695	703	193	4	15	14	16	14	11	2		8
694	704	194	5- 6	16-17	15	17-18-19	15	12	3		9
693	705	195	7	18	16	19	16	13	4		10

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah. 10 mos.	Kings of Judah. 12 mos.	Kings of Israel. 10 mos.	Kings of Israel. 12 mos.	Cycles of Eclipses.	Kings of Assyria.	Kings of Babylon.	Kings of Egypt.
692	706	196	8	19–**20**–1	(16)	**20**	**17**	14	11	11	
691	707	197	9	2			(18)	15	12	12	
690	708	198	10	3			(19)	16	13	1	
689	709	199	11–12	4–5			(20)	17	14	2 Arkea-	
688	710	200	13	6			Interregnum.	18	15	3 nos.	
687	711	201	14	7				19	16	4	
686	712	202	15	8				20	17	5 Senna-	
										cherib.	
685	713	203	16	9				21	1	1	
684	714	204	17–18	10–11				22	2	2	
683	715	205	19	**12**			1	23	3	1 2 Beli-	
682	716	206	20	13			2	24	4	2 3 bus.	
681	717	207	21	14			3	25	5	3 Apara-	
									Sennacherib.		nadius.
680	718	208	22	1–15–16	**1**		(3)–4	26	6	1	3
679	719	209	23–24	2	2 Hezekiah.		5	27	7	2	4
678	720	210	25	3	3		6	28	8	3	5
677	721	211	26	**4**	**4**		**7**	29	9	4	6
676	722	212	27	5–6–7	5		8	30	10	5	7
675	723	213	28	7	**6**		**9**	31	11	6 Rege-	8
										belos.	
674	724	214	29–30	8	7			32	12	1	9

				Kings of Judah.	Cycles of Eclipses.	Kings of Assyria.	Kings of Babylon.	Kings of Egypt.
673	725	215	31	9	33	13	1	10
672	726	216	32	10	34	14	2	11
671	727	217	33	11	35	15	3	12
670	728	218	34	12–13–14	36	16	4	13
669	729	219	35–36	**14**	**1**	17	1	14
668	730	220	37	15	2	18	2	15
667	731	221	38	16	3	19	3	16
666	732	222	39	17	4	20	4	17
665	733	223	40–1	18	5	21	5	18
664	734	224	1–2	19–20–21	6	22	6	19
663	735	225	3	21	7	23	7	20
662	736	226	4	22	8	24	8	21
661	737	227	5	23	9	1	1	22
660	738	228	6	24	10	2	2	23
659	739	229	7–8	25	11	3	3	24
658	740	230	9	26–27–28	12	4	4	25
657	741	231	10	28	13	5	5	26
656	742	232	**11**	29–1	14	6	6	27
655	743	233	12	2	15	7	7	28
654	744	234	13–14	3–4	16	8	8	29
653	745	235	15	5	17	9	9	30
652	746	236	16	6	18	10	10	1

Kings of Judah. Hezekiah. Manasseh.

Kings of Egypt. Tirhakah. Asaridinos. Saosduchin.

Kings of Assyria. Sennacherib. Esarhaddon. Messesimordakus.

Kings of Babylon. Merodach Baladan. Belibus. Aparanadius. Regebelos.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.	Kings of Assyria.	Kings of Babylon.	Kings of Egypt.
651	747	237	17	7	11	11	Psammetichus I. 2
650	748	238	18	8	12	12	3
649	749	239	19–20	9–10	Assurbanipal. 1	Saosduchinos. 1	4
648	750	240	21	11	2	2	5
647	751	241	22	12	3	3	6
646	752	242	23	13	4	4	7
645	753	243	24	14	5	5	8
644	754	244	25–26	15–16	6	6	9
643	755	245	27	17	7	7	10
642	756	246	28	18	8	8	11
641	757	247	29	19	9	9	12
640	758	248	30	20	10	10	13
639	759	249	31–32	21–22	11	11	14
638	760	250	33	23	12	12	15
637	761	251	34	24	13	13	16
636	762	252	35	25	14	14	17
635	763	253	36	26	15	15	18
634	764	254	37–38	27–28	16	16	19
633	765	255	39	29	17	17	20
632	766	256	40– 1	30	18	18	21
631	767	257	1	31	19	19	22
630	768	258	2	32	20	20	23
629	769	259	3– 4	33–34		Kineladinos. 1	24
628	770	260	5	35		2	25
627	771	261	6	36		3	26
626	772	262	7	37		4	27
625	773	263	8	38		5	28
624	774	264	9–10	39–40		6	29
623	775	265	11	41		7	30
622	776	266	12	42		8	31
621	777	267	13	43		9	32
620	778	268	14	44		10	33
619	779	269	15–16	45–46		11	34
618	780	270	17	47		12	35
617	781	271	18	48		13	36
616	782	272	19	49		14	37
615	783	273	20	50		15	38
614	784	274	21–22	51–52		16	39
613	785	275	23	53		17	40
612	786	276	24	54–55		18	41
611	787	277	25	1– 2		19	42
610	788	278	26	1		20	43
609	789	279	27–28	2– 3		21	44
608	790	280	29	4		22	45
				Amon. Josiah.			
					Kings of Babylon.		
607	791	281	30	5	Nabopolassar. 1		46
606	792	282	31	6	2		47
605	793	283	32	7	3		48
604	794	284	33–34	8– 9	4		49
603	795	285	35	10	5		50
602	796	286	36	11	6		51
601	797	287	37	12	7		52
600	798	288	38	13	8		53
599	799	289	39–40	14–15	9		54
598	800	290	1	16	10		1

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Cycles of Decimestrial Years.	Kings of Judah.	Kings of Babylon.		Kings of Egypt.	Kings of Tyre.	Captivities.		Kings of Egypt.	Kings of Tyre.	
									3d of J'kim.	18th Neb.			
597	801	291	2	17	11		Necho. 2						
596	802	292	3	18	12		3						
595	803	293	4	19	13	1	4						
594	804	294	5–6	20–21	14	2	5						
593	805	295	7	22	15	3	6						
592	806	296	8	23	16	4	7						
591	807	297	9	24	17	5	8						
590	808	298	10	25	18	6	9						
589	809	299	11–12	26–27	19	7	10	Ithobal. 1					
588	810	300	13	28	20	8	11	2					
587	811	301	14	29	21	9	12	3					
586	812	302	15	30	(22)	10	13	4					
585	813	303	16	31–1	(23)	11			Captivity of 3d year of Jehoiakim.	Captivity of 18th year of Nebuchadnezzar.	Necho. 14	5	
584	814	304	17–18	1–2	(24)	12					15	6	
583	815	305	19	3	(25) 1	13		0			16	7	
582	816	306	20	4	1	14		1			Hophra. 1	8	
581	817	307	21	5	2	15		2			2	9	
580	818	308	22	6	3	16		3			3	10	
579	819	309	23–24	7–8	4–5	17		4			4	11	
578	820	310	25	9	6	18		5			5	12	
577	821	311	26	10	7	19		6			Psammuthis. 1	13	
576	822	312	27	11–1	8	20		7			2	1	
575	823	313	28	1	9	21		8			3	2	
574	824	314	29–30	2–3	10–11	22		9			4	3	
573	825	315	31	4	12	23		10			5	4	
572	826	316	32	5	13	24		11			6	5	
571	827	317	33	6	14	25		12			7	6	
570	828	318	34	7	15	26		13			8	7	
569	829	319	35–36	8–9	16–17	27		14			9	8	
568	830	320	37	10	18	28		15		0	10	9	
567	831	321	38	11	19	29		16		1	11	10	
566	832	322	39		20	30		17		2	12	*12 †12 ‡12	
565	833	323	40		21	31		18		3	13	1	
564	834	324			22–23	32		19		4	14	2	

Jehoahaz. Jehoiakim. Zedekiah. Jehoiachin.

Nebuchadnezzar.—Sole reign.

* Ecnibalus two months.
† Chelbes ten months.
‡ Abbar three months.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Kings of Babylon.		Captivities. 3d of J'kim.	Captivities. 18th of Neb.	Captivities. 23d of Neb.	Kings of Egypt.	Kings of Tyre.
563	835	325	24	33	20	5	1	15	3
562	836	326	25	34	21	6	2	16	4
561	837	327	26	35	22	7	3	17	5
560	838	328	27	36	23	8	4	18	6
559	839	329	28–29	37	24	9	5	19	1
558	840	330	30	38	25	10	6	1	1
557	841	331	31	39	26	11	7	2	2
556	842	332	32	40	27	12	8	3	3
555	843	333	33	41	28	13	9	4	4
554	844	334	34–35	42	29	14	10	5	1
553	845	335	36	43	30	15	11	6	2
552	846	336	37	1	31	16	12	7	3
551	847	337		2	32	17	13	8	4
550	848	338		1	33	18	14	9	5
549	849	339		2	34	19	15	10	6
548	850	340		3	35	20	16	11	7
547	851	341		4	36	21	17	12	8
546	852	342		1	37	22	18	13	9
545	853	343		2	38	23	19	14	10
544	854	344		3	39	24	20	15	11
543	855	345		4	40	25	21	16	12
542	856	346		5	41	26	22	17	13

Ilauroudanos. Nerigassolassros. Nabonnadius.

Amasis. Mitgonus Merbalos. & Geras-tratus. Balatorus.Hiram.

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Captivities. 3d of J'kim.	Captivities. 18th of Neb.	Captivities. 23d of Neb.	Kings of Babylon.	Kings of Persia.	Kings of Egypt.	Kings of Tyre.	Cycles of Eclipses. B.C. 557.	B.C. 585.	B.C. 527.
541	857	347	42	27	23	6	1	18	14			
540	858	348	43	28	24	7	2	19	15			
539	859	349	44	29	25	8	3	20	16			
538	860	350	45	30	26	9	4	21	17			
537	861	351	46	31	27	10	5	22	18			
536	862	352	47	32	28	11	6	23	19			
535	863	353	48	33	29	12	7	24	20			
534	864	354	49	34	30	13	8	25				
533	865	355	50	35	31	14–15	9	26				
532	866	356	51	36	32	16	10	27				
531	867	357	52	37	33	17	11	28				
530	868	358	53	38	34	1	12	29				
529	869	359	54	39	35	2	13	30				
528	870	360	55	40	36	3	14	31				
527	871	361	56	41	37	4	15	32				
526	872	362	57	42	38	5	16	33				
525	873	363	58	43	39	6	17	34				
524	874	364	59	44	40	7	18	35				
523	875	365	60	45	41	8	19	36				
522	876	366	61	46	42	9	20	37				
521	877	367	62	47	43	10	21	38		1		
520	878	368	63	48	44	11	22	39		2		

Nabonnadius. Cyrus, King of Nations. Cyrus.

Cyrus.

Captivity of the 23d of Nebuchadnezzar.

Chronological Table (Continued).

B.C.	Era of Tabernacle.	Years of Iniquity of Israel.	Captivities. 3d of J'kim.	Captivities. 18th of Neb.	Captivities. 23d of Neb.	Kings of Persia.		Kings of Egypt.	Captivities. B.C. 557.	Captivities. B.C. 585.	Captivities. B.C. 527.	
519	879	369	64	49	45	12	23	Amasis.	3	**13**	9	Persian invasion.
518	880	370	65	50	46	13	24	41	4	**14**	10	
517	881	371	66	51	47	14	25	42	5	**15**	11	
516	882	372	67	52	48	15	26	43	6	**16**	12	
515	883	373	68	53	49	16	27	44	7	**17**	13	
514	884	374	69	54	50	17	28	1	8	**18**	14	
513	885	375	70	55	51	1	29	Psammecheritos.	9	**1**	15	
512	886	376	1	56	52	2	30		10	**2**	16	
511	887	377	2	57	53	3			11	**3**	17	
510	888	378	3	58	54	4			12	**4**	18	
509	889	379	4	59	55	5			13	**5**	**1**	
508	890	380	5	60	56	6			14	**6**	**2**	
507	891	381	6	61	57	7			15	**7**	**3**	
506	892	382	7	62	58	8			16	**8**	**4**	
505	893	383	8	63	59	9			17	**9**	**5**	
504	894	384	9	64	60	10			18	**10**	**6**	
503	895	385	10	65	61	**1**			**1**	**11**	**7**	
502	896	386	11	66	62	2			**2**	12	8	
501	897	387	12	67	63	3			**3**	13	9	
500	898	388	13	68	64	4			**4**	14	10	
499	899	389	14	69	65	5			**5**	15	11	
498	900	390	15	70	66	6			**6**	16	12	

Supplemental years.

Cambyses.

Darius Hystaspes.

Cambyses.

Darius Hystaspes.

Cambyses.

	Captivities. 3d of J'kim.	Captivities. 23d of Neb.	Kings of Persia.	Cycles of Eclipses. B.C. 557.	Cycles of Eclipses. B.C. 585.	Cycles of Eclipses. B.C. 527.	
497	16	67	7	**7**	17	13	
496	17	68	8	**8**	18	14	
495	18	69	9	9	**1**	15	
494	19	70	10	**10**	**2**	16	
493	20	**1**	11	**11**	3	17	
492	21	2	12	**12**	**4**	18	
491		3	13	**13**	**5**	1	
490		4	14	**14**	**6**	2	
489		5	15	**15**	**7**	3	
488		6	16	**16**	**8**	4	
487		7	17	**17**	9	5	
486		8	18	**18**	**10**	6	
485		9	19	**1**	**11**	7	
484		10	20	**2**	**12**	8	
483		11	21	3	**13**	9	
482		12	22	**4**	**14**	10	
481		13	23	**5**	**15**	11	
480		14	24	**6**	**16**	12	
479		15	25	**7**	**17**	13	
478		16	26	**8**	**18**	14	
477		17	27	9	**1**	15	
476		18	28	**10**	**2**	16	

Darius Hystaspes.

Darius Hystaspes.

Darius Hystaspes.

Period of 21 supplemental years of Daniel.

Second capture of Babylon following the insurrection of Aracus (?). Behistun inscription.

Chronological Table (Continued).

B.C.	Captivity of 23d of Nebuchadnezzar.	Kings of Persia.	Cycles of Eclipses. B.C. 557.	B.C. 585.	B.C. 527.	
475	19	29	**11**	**3**	17	
474	20	30	**12**	**4**	18	
473	21	31	**13**	**5**	**0**	
472	1	32	**14**	**6**	**1**	Babylon captured by Darius and Xerxes.
471	2	33	**15**	**7**	**2**	
470	3	34	**16**	**8**	**3**	
469	4	35	**17**	**9**	**4**	
468	5	36	**18**	**10**	**5**	
467	6	1	**1**	**11**	**6**	
466	7	2	2	**12**	**7**	
465	8	3	3	**13**	**8**	
464	9	4	4	**14**	**9**	
463	10	5	5	**15**	**10**	
462	11	6	6	**16**	**11**	
461	12	7	7	**17**	**12**	
460	13	8	8	**18**	**13**	
459	14	1	9	**1**	**14**	
458	15	2	10	2	**15**	
457	16	3	11	3	**16**	
456	17	4	12	4	**17**	
455	18	5	13	5	**18**–1	
454	19	6	14	6	2	
453	20	7	15	7	3	
452	21	8	16	8	4	
451	22	9	17	9	5	
450	23	10	18	10	6	
449	24	11	**1**	11	7	
448	25	12	**2**	12	8	
447	26	13	**3**	13	9	
446	27	14	**4**	14	10	
445	28	15	**5**	15	11	
444	29	16	**6**	16	12	
443	30	17	**7**	17	13	
442	31	18	**8**	18	14	
441	32	19	9	1	15	
440	33	20	**10**	2	16	
439	34	21	**11**	3	17	
438	35	22	**12**	4	18	
437	36	23	**13**	5	1	
436	37	24	**14**	**6**	2	
435	38	25	**15**	**7**	3	
434	39	26	**16**	8	4	
433	40	27	**17**	9	5	
432	41	28	**18**	10	6	
431	42	29	**1**	11	7	
430	43	30	**2**	12	8	
429	44	31	**3**	13	9	
428	45	32	**4**	14	10	
427	46	33	**5**	15	11	
426	47	34	**6**	16	12	
425	48	35	**7**	17	13	
424	49	**1**	**8**	18	14	
423		**2**	**9**	**1**	15	"Then ceased the work of the house of God which is at Jerusalem. So it ceased unto the second year of the reign of Darius king of Persia."—Ezra iv. 24.
422		3	10	**2**	16	
421		4	**11**	**3**	17	
420		5	**12**	**4**	18	
419		**6**	**13**	**5**	1	
418		**7**	**14**			"And this house was finished on the third day of the month Adar, which was in the sixth year of the reign of Darius the king."—Ezra vi. 15.
417		8	**15**			
416		9	**16**			
415		10	**17**			
414		11	**18**			
413		**12**	**1**			

Period of 7 weeks of Daniel, or 49 years.

Darius Hystaspes. Xerxes. Artaxerxes I. Darius Nothus.

Darius. Xerxes. Artaxerxes I. Darius Nothus.

THE SYNCHRONOUS HISTORIES OF JUDAH AND ISRAEL.

The chronology is peculiar. There was more than one reckoning of the years of each king. A king's years were counted by the decimestrial year, either from his real accession or from the beginning of the cycle of forty years immediately following that event. Besides these two, there was a reckoning by years of twelve months, and another by a cycle of two periods for the return of an eclipse, or thirty-six *plus* years. As a rule, the years are reckoned from the accession, and the cycle of eclipses confirms the accuracy of the regal years so counted. With a chronology made of such mixed elements there would be endless confusion were it not that the Bible has preserved certain synchronisms between the two lines. To reproduce these in the table, the above-described reckonings of years are employed, for they are found in one or the other of them.

The table as arranged has one disadvantage. In order to avoid a cumbrous length, the decimestrial years are arranged as they fell in the vague year of twelve months. The method adopted in the Bible of giving every year in which a king reigned causes, as already noticed, the first and last years of two successive kings to overlap. For example, Nadab began to reign in the second year of Asa, and reigned two years, and his successor Baasha began in the third year of Asa. This may mean either between the second and third of Asa a year came to an end, which was reckoned as year one of Nadab, and a second year began which was his second year, he not reigning even one full year, or Nadab completed one full year reckoned from a date in the second of Asa to the same in the third year of that king, and continued to reign after that for a portion of a second year, and that Baasha, who began in the third of Asa, also had a portion of this third year for his first. This causes these years to crowd each other on the same line, which would not be the case if each decimestrial year had a line to itself. This is further complicated by the fact that the line of Israel has a different arrangement of the decimestrial years from that of Judah, and once in every cycle of five years three decimestrial of the line of Israel fall in the same vague year to two of the line of Judah.

For the line of Judah the order of decimestrial years followed in the first chronological table is continued. It began in B.C. 1397, the era of the exodus. For the line of Israel a new series of ten-month years is begun. The cycles connected with them have for their era the fourth year of Jeroboam I., B.C. 885, and, counting back, his first year begins with the tenth month. The two cycles of five years use the same months, but they are divided differently into decimestrial years. This is shown in the following comparative table:

Months divided into Decimestrial Years for the Line of Judah.			Months divided into Decimestrial Years for the Line of Israel.	
B.C.	Months.	Years.	Months.	Years.
888	10– 2	1–2	9– 3	1–2
887	8– 4	2–3	7– 5	2–3
886	6– 6	3–4	5– 7	3–4
885	4– 8	4–5	3– 9	4–5
884	2–10	5–6	1–10–1	5–6–1

Each of the minor cycles throughout the table correspond in the manner of the foregoing table. The cycles of the decimestrial years of the line of Israel are not in the table. They may at any time be obtained from the following epochs:

Cycle	I.	begins	with	fourth	month,	B.C.	885
"	II.	"	"	eighth	"	"	852
"	III.	"	"	tenth	"	"	818
"	IV.	"	"	fourth	"	"	785
"	V.	"	"	eighth	"	"	752
"	VI.	"	"	tenth	"	"	718
"	VII.	"	"	fourth	"	"	685

I have adopted this arrangement of the decimestrial years for two reasons,—its convenience in regulating the regal years of the table, and because the cycle of which Jeroboam II. is the eponym begins with the eighth month. This eighth month is epochal, and perhaps the first cycle, which began in 885, should begin with this month rather than the fourth, in which case that of Jeroboam II. will commence with the tenth month. Whichever is followed, it will not materially affect the table.

JEROBOAM I.

Jeroboam fled to Egypt during the reign of Solomon, and it appears he there became Egyptianized. When he became king he resolved to institute certain forms of the Egyptian religion among his people. The introduction of this worship raised a barrier between Israel and Judah, and it was by this and other means the separation was to be made permanent. He made two golden calves, and set one up in Bethel, and the other in Dan, "and this thing became a sin." He also ordained a feast on the fifteenth day of the eighth month, and at this time he offered on the altar at Bethel, and burned incense to the golden calf. He appointed priests of the very lowest of the people, who were not of the sons of Levi. "So he offered upon the altar which he had made in Bethel the fifteenth day of the eighth month, even in the month which he had devised in his own heart; and ordained a feast unto the children of Israel: and he offered upon the altar, and burnt incense." Jeroboam, when he instituted this worship, had deprived the Levites of their priestly office. They left Israel and came to Rehoboam and strengthened his hands three years. In the fifth year of Rehoboam, Shishak, king of Egypt, came against Jerusalem and took that city. The presumption is the three years just mentioned came to an end at this time, they corresponding to the third, fourth, and fifth years of Rehoboam, which places the departure of the Levites from Israel, and the institution of the new worship, in B.C. 885. The Egyptians, according to Latin and Greek writers, worshipped three deities emblematized by the bull,—Apis, whose seat was at Memphis, the bull Mnevis of Heliopolis, and the Pacis of Hermonthis. The accounts are not harmonious. Apis was sacred to the moon, and Mnevis and Pacis sacred to the sun, and again the three were all sacred to Apollo or the sun. It is held by some that the worship instituted by Jeroboam was not that of Apis, but of Mnevis, the white bull worshipped at Heliopolis. Josephus credits Manetho with a story which makes Moses a priest of Heliopolis, thus connecting that city with the sojourning of the Jews in Egypt. It is said Jeroboam "ordained a feast in the eighth month, on the fifteenth day of the month, like unto the feast that is in Judah, and he offered

upon the altar. So did he in Bethel, sacrificing unto the calves that he had made." The feast in Judah in the seventh month was from the fifteenth day for seven days, special mention being made of the first and eighth days of the festival. One explanation of this may be that as the Jewish days began at sunset, the seven days were counted from the even of the fifteenth day, and were the 16th, 17th, 18th, 19th, 20th, 21st, and 22d days of the month, but the 15th was also a day of the festival, thus accounting for the statement that the festival was for seven days, while mentioning the first and eighth days as sabbaths. In this sense the festival of the fifteenth day was that of the eve of the feast of tabernacles. The likeness between the festival established by Jeroboam and that observed in Judah was probably confined to some of the outward forms and ceremonies, and the beginning of it upon the fifteenth day points to the following of the same order of the days. Without hazarding an opinion whether the worship of the golden calves was that of Apis or Mnevis, or of both, it may be noticed that, according to the accounts, the Egyptian festival in honor of Apis lasted seven days. There was also a superstition that during the progress of the festival there was no danger from the crocodiles while bathing in the Nile, but that this immunity ceased after the sixth hour of the eighth day. It is also related that the festival connected with the inauguration of Apis was at the time of new moon.

By applying the same rules that have been used to determine the other dates, the following result is obtained for the dates 15th and 16th of the eighth month, B.C. 885.

B.C. 885, new moon on July 13.
" " " Khoiakh 17.
" " " eighth month, sixteenth day.

On the fifteenth day, the eve of the feast, the moon was rising and setting in conjunction with the sun. The true conjunction was on the sixteenth day. The star Sirius rose heliacally on the 13th of July in this year; it did so on the 16th of the eighth month. The date July 13, B.C. 885, was also that of a solar eclipse, which is noticed on the Assyrian monuments.

The epoch of Jeroboam I., B.C. 888, the 1st of the tenth month, is an assumed epoch. The chronology of the line of Israel ignores entirely the time intervening between the death of Solomon and the accession of Jeroboam to the throne of Israel, which belonged to the reign of Rehoboam, the lawful sovereign up to the time the revolution became an accomplished fact. The first year of Rehoboam follows immediately the fortieth year of Solomon. This is not inconsistent with the probable fact that he began to reign before this. The previous chronology has been shown to consist of eponymous cycles of forty decimestrial years, and a number of terms of office, and captivities in years of twelve months. The hypothesis in explanation of the use of the periods of forty years was that they denoted cycles of which certain persons were the eponyms, and not necessarily the limits of their actual terms of office. Rehoboam is given seventeen years; that is, he reigned seventeen years after the forty years, which came to an end in B.C. 888. The twenty-second year of Jeroboam has been omitted from the table. The synchronisms require Asa to begin his reign in the twentieth year of Jeroboam, and Nadab, the successor of Jeroboam, to begin in the second of Asa, which leaves a narrow margin for the twenty-second of Jeroboam; for Asa's second year must begin in the twenty-first of Jeroboam, and Nadab's first year in the second of Asa. I am of the opinion that the twenty-two years of Jeroboam denoted a period for the return of an eclipse, and that they were cyclic in character; the two hundred and twenty-three lunar months of such a period being divided into twenty-two decimestrial years, with three intercalary months. Such a period corresponds to twenty-one decimestrial years, with six intercalary months by the Egyptian year, or twenty-one years with nine intercalary months by the Babylonian year. This in the table will reduce the years of Jeroboam one year, while accounting for the presence of the statements concerning his twenty-second year. The use of such a cycle connects Jeroboam with an eclipse as its eponym at about the time he became king, not necessarily one in the year B.C. 888, because his actual epoch may not have been in this year, although the one he assumed was. With this view his twenty-one or twenty-two years were got by counting back to the year 510,

era of the tabernacle. It may be thought singular that by doing so he gets for the length of his reign a period of decimestrial years for the return of an eclipse when possibly the proper period had not terminated at his death, but more extraordinary things than this may happen. The twenty-two years of Ahab will bear a similar construction and so far support the hypothesis. The cycles of eclipses in the table which begin in B.C. 885, as they commence almost uniformly in the first years of certain kings of Israel, confirm the chronology. Jeroboam I. is the eponym of the first one.

OMRI.

Omri begins to reign in B.C. 849. In this year the second cycle of eclipses begins. The record does not state the year in the line of Judah corresponding to the first year of Omri. The account is peculiar. It says Omri began to reign over Israel in the thirty-first year of Asa, and he reigned six years in Tirzah. The next item is Ahab begins in the thirty-eighth year of Asa; that is, seven years after the thirty-first year of that king; so the count of the twelve years of Omri must end in the thirty-eighth year of Asa and begin with his twenty-seventh year, the year in which fell the seven days of his predecessor, Zimri. Zimri had conspired against Elah and slain him and all the house of Baasha. After a reign in Tirzah of seven days, Omri, the captain of the host, who had been made king by the Israelites, when they heard of the act of Zimri, came against him and besieged Tirzah. When Zimri perceived the city was taken, he set on fire the king's palace and perished in the flames. After this there was a struggle between Tibni, the son of Ginath, and Omri, because half of the people followed Tibni to make him king. This was finally terminated by the triumph of the party of Omri and the death of Tibni. It may be concluded that the thirty-first of Asa was the year in which Omri became the undisputed master of the kingdom of Israel. The fifth and sixth years of Omri are for a part current in the thirty-first year of Asa.

JEHU.

Jehu is the eponym of the cycle of eclipses which began in B.C. 813. This fell in his first year. From this point on down

to the reign of Menahem is found the most difficult portion of the chronology. The table contains three columns of years for the line of Israel. The first is a continuation of that followed for the line of Israel to this point; the second contains the reigns of Jehu, Jehoahaz, Jehoash, and Jeroboam II. in years of twelve months; and the third column has the decimestrial years corresponding to the twelve-month years of the second column. The reason for this double reckoning for the line of Israel—for there are only two; the second and third columns are only variants of one reckoning—is found in the effect produced upon the reign of Jeroboam II.

JEHOAHAZ AND JEHOASH OF ISRAEL.

Jehoahaz reigns seventeen years and Jehoash sixteen years. Jehoahaz begins in the twenty-third year of Jehoash of Judah, and Jehoash in the thirty-seventh year of this king of Judah. The difficulty is to bring the seventeen years of Jehoahaz of Israel within the fifteen years between the twenty-third and thirty-seventh year of Jehoash of Judah. In the first column of the line of Israel, Jehoahaz follows Jehu, and his first year falls rightly in the twenty-third year of Jehoash of Judah. In the second column of the line of Judah, Jehoash of Israel begins in the thirty-seventh year of the cycle of forty years, of which we may conclude Jehoash of Judah became the eponym in B.C. 798. Jehoash of Israel became the eponym of the cycle of an eclipse in B.C. 777. This is the fourth cycle of the series. This is the portion of the history in which the gaps in the lines of Judah and Israel occur, and this condition of things may explain in part their occurrence. The statement of the thirty-seventh year of Jehoash of Judah is derived from the reckoning of the second column of the line of Israel.

Amaziah begins in the second year of Jehoash of the reckoning of the first column for the line of Israel.

JEROBOAM II.

Jeroboam II., in the first column of the line of Israel, begins, in accordance with the Bible statement, in the fifteenth year of Amaziah. Zachariah, the successor of Jeroboam II., begins to reign in the thirty-eighth year of Azariah. In this year also

terminated the forty-first and last year of Jeroboam II. by the reckoning of the third column of the line of Israel. This cycle of forty-one decimestrial years is the fifth of the series reckoned from B.C. 885; it began in B.C. 752 with the eighth month. The forty-one years are taken to be lunar years, and represent forty years, using months of thirty days, and are put in the table rendered into that form. At the thirty-eighth year of Azariah the reckoning of the second column touches and harmonizes with the line of Judah. It thus appears that the placing of Zachariah at the thirty-eighth year of Azariah was brought about by counting the reigns of Jehu, Jehoahaz, and Jehoash as full years of twelve months, and the reign of Jeroboam by the cycle of forty decimestrial years.

AZARIAH.

The statement that Azariah began to reign in the twenty-seventh year of Jeroboam II. is to be explained to mean that he became the eponym of a cycle of an eclipse in that year. This was a first year in that respect, at least.

MENAHEM.

The years of Menahem are those of twelve months.

PEKAHIAH, PEKAH, JOTHAM, AHAZ, AND HOSHEA.

The following historical statements are to be followed for these kings:

Pekahiah succeeded Menahem and reigned two years (II. Kings xv. 23).

Pekah slew Pekahiah and reigned in his stead in the fifty-second year of Azariah (II. Kings xv. 25, 27).

Jotham began to reign in the second year of Pekah and reigned sixteen years (II. Kings xv. 32, 33).

Hoshea slew Pekah in the twentieth year of Jotham (II. Kings xv. 30).

Ahaz succeeded Jotham and began to reign in the seventeenth year of Pekah and reigned sixteen years (II. Kings xvi. 1, 2).

Pekah and Rezin were confederate against Ahaz of Judah (II. Kings xv. 37).

Hoshea began to reign in the twelfth year of Ahaz (II. Kings xvii. 1).

Some of these are apparently conflicting statements, but by inspection of the table it will be found that they are all carried out. If there is no other argument to favor the use of the decimestrial year to explain Jewish chronology, this portion of the history will furnish one. In no other way may the twentieth year of Jotham, the sixteenth year of Jotham, the twentieth year of Pekah, the seventeenth year of Pekah, and the first of Ahaz be brought upon the same chronological line, which must be done to conform to statements of the Bible.

Pekah and Rezin were confederate against Ahaz of Judah. By the table the last year of Pekah concurred in part with the first year of Ahaz. This gives, perhaps, a too narrow margin for the confederation, but it is required by the statement of the death of Pekah in the twentieth year of Jotham. If this last statement must be abandoned, the reign of Pekah may be extended three years, giving him twenty years of twelve months instead of twenty years of ten months.

Another explanation is suggested by the similarity between the names Jotham and Ahaz. According to Assyrian inscription, Jehoahaz was reigning at this time. Jehoahaz has been identified as Ahaz, but the name resembles Jotham as much as Ahaz. It is possible that both Jotham and Ahaz had the same name,—Jehoahaz,—and the Jewish chronicler, in order to distinguish between the two, gave Jotham that portion of Jehoahaz which contained the element Jehovah, and the remainder of the name to Ahaz. Jehoahaz means "whom Jehovah possesses," and Jotham, "Jehovah is upright," and Ahaz, "Possessor." Ancient chronologers distinguish between kings of the same name in a way similar to this. The three Psametiks of the twenty-sixth dynasty are known from each other by only a slight change in the spelling. These kings are named by Africanus, Psammeticus, who answers to Psametik I.; Psammuthis, who is Psametik II.; and Psammechites, who is Psametik III. The confederation was between Rezin of Syria and Pekah against Jehoahaz (Jotham). In the twentieth year of Jotham (Jehoahaz), Pekah was slain by Hoshea. This was followed by a civil war or an interregnum lasting about nine years,

which was finally put to an end by the Assyrians, who established Hoshea upon the throne in the twelfth year of Ahaz (Jehoahaz). The objection to this is that, although the Assyrians might have confused Jotham with Ahaz, it would be out of the ordinary for the Jewish historian to do so.

HEZEKIAH.

The regal years of this king are found in the table in the form of the sabbatical week of years. This arrangement has been followed for Hezekiah for reasons connected with the synchronous history of Judah and Assyria, which are explained in the chapter on that subject. The last of the series of eclipses found in the table begins in B.C. 669, in which year fell the fourteenth year of Hezekiah.

The epochs of other kings in the table have eclipses. For example, Jeroboam II. begins his reign in B.C. 763, in which year there was observed a total eclipse of the sun in Central Asia on June 15, which concurred with the 18th of the eighth month of the Jewish year as laid down in the work. The reckoning by the cycles of eclipses does not necessarily imply that an eclipse was always observed for each cycle. Thirty-six years, fifteen hours, and twenty-five minutes, *plus*, was known as a period for the return of the same eclipse.

Applying the method of prediction by the cycle, the eclipses of these cycles will be visible or invisible in the same locality as follows:

B.C. 885, July 13, visible in the afternoon.
" 849, August 4, visible in the morning.
" 813, August 25, invisible.
" 777, September 16, visible in the afternoon.
" 741, October 8, visible about sunrise.
" 705, October 29, invisible.
" 669, November 20, visible about one o'clock P.M.

The remainder of the chronology is treated in the chapters upon the synchronous histories of Assyria, Babylonia, and Persia.

PART III.

JEWISH AND SYNCHRONOUS HISTORIES.

CHAPTER XIV.

THE REDUCTION OF THE ERA OF NABONASSAR.

The number by which it is proposed to reduce the year of the era of Nabonassar is obtained from a variety of sources. While the effect upon the era is to bring it down nineteen years, as the changes to produce this are made at several places in the canon, the differences between the new and old epochs are not the same for all. The alterations are principally made in the Persian portion of the canon. No corrections are made below the reign of Artaxerxes Longimanus. The regal years of Artaxerxes are reduced six years, from forty-one to thirty-five; those of Xerxes from twenty-one to eight years; and those of Cambyses are increased two years, from eight to ten. Eight years are added to the regal years of Cyrus, which gives him seventeen instead of nine. The years of Nabopolassar are increased four years, giving him a total of twenty-five instead of twenty-one. Those of Nebuchadnezzar are made to overlap the last thirteen years of Nabopolassar as previously raised, and Esarhaddon receives twelve years instead of thirteen. The total of the reductions is thirty-three years, and of the additions fourteen years, and the difference between these constitutes the reduction of nineteen years for the era.

It is asserted that the present condition of the canon is correct, because it is fixed by the eclipses, which are recorded as having been observed on dates mentioned in connection with the regal years of certain kings. In the present condition of the canon the 1st of Thoth, B.C. 747, is made to fall on the 26th of February. This is a wrong date for the Egyptian year. In Part I. of this work the correct adjustment between the Egyptian and the Julian year was made. It was proven true in many instances, some later and some earlier than the year B.C. 747, the correct adjustment between the two being February 23, concurrent with the 1st of Thoth. If the Egyptian dates

in the canon are wrong, there is no objection arising from them to the proposed reduction on the ground that by so doing the dates of certain eclipses will be changed. On the other hand, if the months and days of the dates of the eclipses are correct, then their epochs in the canon must have been changed, accounting, in this way, for the wrong adjustment between the Julian and the Egyptian year; and if the epochs were changed, what becomes of the correctness of the canon? The argument might be rested here, were it not important to extend it to the length of restoring or amending the list of Ptolemy to conform to historical truth.

As to the method of making the proposed changes there are several guiding facts. First, the years of the canon are said to be astronomically fixed; that is, certain years of certain reigns are checked by the eclipses which are said to have fallen in them. This implies a series of cycles of eclipses, and if they can be traced in the canon they will render important aid in determining the truth of the matter. Second, there are some Egyptian inscriptions which bear upon the reigns of Cambyses, Darius, Xerxes, and Artaxerxes, and which require a certain arrangement of the years of these kings. Third, one of the Egibi tablets mentions the eleventh year of Cambyses.

The proposed changes are taken up in their order, beginning with that affecting the earliest reign.

ESARHADDON.

The reduction of the regal years of Esarhaddon one year is made on the authority of the Babylonian chronicle,* a document which is dated of the twenty-second year of Darius Hystaspes.

NABOPOLASSAR AND NEBUCHADNEZZAR.

The changes connected with these two reigns are suggested by the chronology found in Josephus's "Antiquities of the Jews," and their bearing upon certain statements made by Herodotus, and synchronisms mentioned in the Bible. To avoid repetition these will be found considered in the chapter upon the synchro-

* "Records of the Past," New Series, vol. i.

nisms between Jewish, Babylonian, and Persian histories. It may be noticed here that the temporary effect upon the canon is to lower epochs nine years, Nebuchadnezzar overlapping the twenty-one years of Nabopolassar in the canon nine years; the four years added to Nabopolassar only affect the length of the joint reigns of the two. This nine years more than counteracts the eight years added to the reign of Cyrus.

CYRUS.

The addition of eight years to the reign of this king is made in order to give to Cyrus the twenty-nine years which, upon the authority of Herodotus, he is said to have reigned.* According to Tyrian annals furnished by Josephus,† Cyrus began to reign in the sixth year of Nabonadius. This will leave for the interval between the fifth year of Nabonadius and the first year of Cambyses twelve years of Nabonadius *plus* nine years of Cyrus, or twenty-one years, which, increased by eight years, complete the twenty-nine years mentioned. The effect of the other changes to be made in the canon upon the epoch of Cyrus will be to bring it to B.C. 530, which is the epoch of the first year of Cambyses in the present state of the canon, or without the changes being made.

CAMBYSES.

Mr. Pinches furnishes two facts from the Egibi tablets.‡ One of these mentions "the first year of Cambyses, King of Babylon, and in this day also Cyrus, his father, King of Countries." The other records the eleventh year of Cambyses. These eleven years are placed so that the first of them overlaps an eighteenth or last year of Cyrus, and the eleventh year falls on a line with the first of Darius Hystaspes. This leaves Cambyses ten years in the table.

XERXES AND ARTAXERXES.

The Egyptian inscriptions affecting these reigns are those of two Persians in the employ of Darius, Xerxes, and Artaxerxes.

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* Book I. 214.

† "Against Apion," Book I. 21.

‡ Transactions Soc. Bib. Archæology, vol. vi. p. 485.

One of these memorializes the service of Ataiuhi during six years of Cambyses, thirty-six years of Darius, and twelve years of Xerxes.* Another inscription of the same person declares he had lived thirty-six years of Darius and in thirteen years of his son Xerxes.† A third inscription records the life of Aliurta, a Persian, for five years of Artaxerxes and for sixteen years of Artaxerxes.‡ If there were two methods of counting the years of these kings, one by regal years and the other by cyclic, this may explain why the years of Artaxerxes are mentioned in the peculiar manner of the inscription of Aliurta. The thirteen years of Xerxes, if the reduction of that king's reign from twenty-one years to eight is to stand, may be explained to cover his sole reign of eight years, and five years of a joint reign either with Darius or Artaxerxes.

To determine the series of eclipses belonging to the Persian portion of the canon, attention is directed to those of B.C. 557, B.C. 585, and B.C. 527. The solar eclipse, B.C. 557, May 19, is supposed by modern astronomers to be the one mentioned by Xenophon as having been observed at the time of the capture of Larissa by the Persians. The solar eclipse of B.C. 585, May 28, is supposed by astronomers to be the one predicted by Thales, and to have been observed in Asia Minor at the time of the battle between Cyaxares and Alyattes.

The series of B.C. 527 contains the lunar eclipse of B.C. 491, which chronologers usually identify as the eclipse of Darius Hystaspes's thirty-first year. These eclipses are connected with important events in Persian history, and may be chosen for eras.

The following table displays cycles reckoned from each of these supposed eras. It also contains the proposed changes for the regal years of the canon and the Julian epochs:

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* "Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xix. p. 303. Eng. trans.

† Ibid., p. 304.

‡ Ibid.

Table of Eclipse-Cycles, B.C. 527–413.

B.C.	Canon with the Proposed Changes.	Cycles of Eclipses.		
		557.	585.	527.
527	Cyrus. 4			1
526	5			2
525	6			3
524	7			4
523	8			5
522	9			6
521	10	1		7
520	11	2		8
519	12	3		9
518	13	4		10
517	14	5		11
516	15	6		12
515	16	7		13
514	17	8		14
513	(18) 1	9	1	15
512	2	10	2	16
511	Cambyses. 3	11	3	17
510	4	12	4	18
509	5	13	5	1
508	6	14	6	2
507	7	15	7	3
506	8	16	8	4
505	9	17	9	5
504	10	18	10	6
503	(11) 1	1	11	7
502	2	2	12	8
501	Darius Hystaspes. 3	3	13	9
500	4	4	14	10
499	5	5	15	11
498	6	6	16	12
497	7	7	17	13
496	8	8	18	14
495	9	9	1	15
494	10	10	2	16
493	11	11	3	17
492	12	12	4	18
491	13	13	5	1
490	14	14	6	2
489	15	15	7	3
488	16	16	8	4
487	17	17	9	5
486	18	18	10	6
485	19	1	11	7

Table of Eclipse-Cycles, B.C. 527–413 (Continued).

B.C.	Canon with the Proposed Changes.	Cycles of Eclipses.		
		557.	585.	527.
484	20	2	12	8
483	21	3	13	9
482	22	4	14	10
481	23	5	15	11
480	24	6	16	12
479	25	7	17	13
478	26	8	18	14
477	27	9	1	15
476	28	10	2	16
475	29	11	3	17
474	30	12	4	18
473	31	13	5	0
472	32	14	6	1
471	33	15	7	2
470	34	16	8	3
469	35	17	9	4
468	36	18	10	5
467	1	1	11	6
466	2	2	12	7
465	3	3	13	8
464	4	4	14	9
463	5	5	15	10
462	6	6	16	11
461	7	7	17	12
460	8	8	18	13
459	1	9	1	14
458	2	10	2	15
457	3	11	3	16
456	4	12	4	17
455	5	13	5	18–1
454	6	14	6	2
453	7	15	7	3
452	8	16	8	4
451	9	17	9	5
450	10	18	10	6
449	11	1	11	7
448	12	2	12	8
447	13	3	13	9
446	14	4	14	10
445	15	5	15	11
444	16	6	16	12
443	17	7	17	13
442	18	8	18	14
441	19	9	1	15
440	20	10	2	16
439	21	11	3	17
438	22	12	4	18

Darius Hystaspes. Xerxes. Artaxerxes. Xerxes. Artaxerxes I.

Table of Eclipse-Cycles, B.C. 527–413 (Continued).

B.C.	Canon with the Proposed Changes.	Cycles of Eclipses.		
		557.	585.	527.
437	23	13	**5**	1
436	24	14	**6**	2
435	25	15	**7**	3
434	26	16	**8**	4
433	27	17	**9**	5
432	28	18	**10**	6
431	29	1	**11**	7
430	30	2	**12**	8
429	31	3	**13**	9
428	32	4	**14**	10
427	33	5	**15**	11
426	34	6	**16**	12
425	35	7	**17**	13
424	1	8	18	14
423	**2**	9	**1**	15
422	3	10		16
421	4	11		17
420	5	12		18
419	**6**	13		**1**
418	7	14		
417	8	15		
416	9	16		
415	10	17		
414	11	18		
413	12	**1**		

Darius Nothus.

Darius Nothus.

CYCLES OF THE SERIES OF B.C. 557.

The first cycle of this series to be noticed is the one beginning in B.C. 503, in the first year of Darius Hystaspes. Darius reigned thirty-six years; he therefore completed two cycles of this series. The next cycle began with the first year of Xerxes, his successor. The last cycle of this series noted in the table is the one which began in B.C. 413, the twelfth year of Darius Nothus. The recorded eclipse of this year was a lunar eclipse on the 27th of August.

CYCLES OF THE SERIES OF B.C. 585.

The first of this series to be noticed is that of B.C. 513. In this year began the cycle of Cambyses's first year, the first year of the eleven years of the Babylonian inscription, and the one in

which he reigned jointly with Cyrus; the record is "the first year of Cambyses, King of Babylon, and in this year also Cyrus, King of Countries." The next one to be noticed is connected with the first year of Artaxerxes. The last one to be noticed began in B.C. 423, the second year of Darius Nothus. This was the year following the expiration of the seven weeks of years of Daniel, which denoted the time at which the persecutions of the Jews ceased.

CYCLES OF THE SERIES OF B.C. 527.

The first cycle of this series to be noticed is the one beginning in B.C. 509, by which a seventh year for Cambyses begins in B.C. 503, which was also the year in which he died. The second is the one beginning in B.C. 473, in the thirty-first year of Darius Hystaspes. It marks the beginning of the joint reign of Darius and Xerxes, and it ended in the fifth year of Artaxerxes. This, with the one of Artaxerxes beginning in B.C. 459, explain the meaning of the inscription of Aliurta. To illustrate this point, the mode of denoting the years of this cycle are changed. All the others of the three series are arranged to show the epochs in which each year began; this cycle displays the years in which each came to an end. The five years' joint cyclic reign of Xerxes and Artaxerxes are the last five years of the same cycle. A recorded eclipse in B.C. 491 was of the moon, April 25. This was in the thirty-first of Darius by the canon of Ptolemy, as that list now stands, which is exactly one cycle, or eighteen years, earlier than the epoch of his thirty-first year as brought about by the proposed changes. Whether Xerxes died at the end of his sole reign, and the five years mentioned by Aliurta were only cyclic joint years, or whether he reigned jointly with Artaxerxes five years longer, is not determined by these cycles. The third to be noticed, and the last in this series, is the one beginning in 419 B.C., and the sixth year of Darius Nothus. This is the year in which the Jews completed their temple at Jerusalem. If there is a reason to be given for the number twenty-one as connected with the years of Xerxes, it may be that it was obtained from his cycle of eighteen years, which may have been on record in the terms of decimestrial years. The same applies to the forty-one years of Artaxerxes.

This king's first year began with the cycle of B.C. 459. His second cycle began in B.C. 441, and his thirty-fifth year corresponds to the seventeenth year of that cycle. The eighteen years of the first cycle equal twenty-one decimestrial years, and the seventeen years of the second equal nineteen years of ten months *plus* five months. The two items in decimestrial years equal forty years *plus* five months, therefore the thirty-fifth year of twelve months came to an end in the forty-first year of ten months. In this calculation the nine intercalary months are placed at the beginning of the cycle, and are not counted, but leaped over. They throw the decimestrial years all nine months later in a comparison between them and a parallel series of twelve months. By this table it is shown that the proposed changes cause the first years of Cambyses, Darius Hystaspes, Xerxes, and Artaxerxes to have the first years of cycles reckoned from the eras of two great historical events which lie at the beginning of Persian history, one of which is connected with the birth of that empire.

It is not claimed that each of these cycles was commenced by a visible solar eclipse, but that they were reckoned from eras connected with such. The region in which they might have been observed was as extensive as the Persian empire.

THE ECLIPSE OF THE SEVENTH YEAR OF CAMBYSES.

The statements in the Almagest in respect to the eclipse in the seventh year of Cambyses do not agree with the canon. This eclipse is recorded as being in the two hundred and twenty-third year of the era of Nabonassar, in the seventh year of Cambyses, and on the 17th–16th of Phamenoth.* According to the received canon, with the adjustment of February 26 the seventh year of Cambyses was the two hundred and twenty-fifth year of the era. This year of Cambyses began in B.C. 523, with 1st of Thoth concurrent with 1st of January, and chronologers have found the eclipse of this seventh year to be the one on July 16. The Almagest requires the eclipse to have been on the 17th–16th of Phamenoth,—that is, about midnight on the 17th at Babylon and on the 16th at Alexandria. By the wrong adjustment between

* Transactions Soc. Bib. Archæology, vol. i. p. 269.

the Egyptian and Julian years, July 16, B.C. 523, will concur with Phamenoth 17; but by the correct adjustment, that of February 23, B.C. 747, the concurrent date for July 16 is Phamenoth 20. Since the Julian year was not in existence at this time, the only particular of the statement found in the Almagest which is adhered to by the identification of the eclipse as the one of July 16 is the seventh year of Cambyses. By the proposed changes in the canon, the seventh of Cambyses had for its epoch B.C. 507. The 17th Phamenoth, by the correct adjustment, concurred in this regnal year with July 9, B.C. 506. This was also in the two hundred and twenty-third year of the era reckoned from B.C. 728; it began in B.C. 507, on the 25th of December, adjustment of February 23. The full moon was on the 17th of Phamenoth. Whoever is responsible for the present condition of the canon had in view an eclipse for the seventh year of Cambyses, and the canon is arranged so that the seventh year of Cambyses may fall in B.C. 523, in which year there was a lunar eclipse at Babylon, about midnight on the 16th of July. If Sosigenes, who was employed by Julius Cæsar to regulate the Roman year, began that year with the 1st of January at the third quarter of the moon, the 25th of December of the common Julian year B.C. 46, which is proven to be the case in Part I., the Julian dates will be seven days earlier, and July 16 by the correct Julian will correspond to July 9 of the incorrect Julian. In B.C. 506, July 16 of the correct Julian concurred with Phamenoth 17 by the correct adjustment. It is sufficient to state the facts to demonstrate, that if the status of the Julian year and the Egyptian year are in any way dependent upon a lunar eclipse in B.C. 523 on July 16 concurrent with Phamenoth 17, that that alone may determine the character of these years as recognized by chronologists. And if the concurrence of July 16 with 17th Phamenoth properly belongs to B.C. 506, it will confirm the position I have taken, that the present status of the Julian is wrong, and as the adjustment of its dates to the Egyptian year is also wrong, the combined error is an outcome of an effort to place a lunar eclipse in the seventh year of Cambyses on July 16 concurrent with Phamenoth 17, B.C. 523.

One of the three particulars of the eclipse is probably cor-

rect: the 17th of Phamenoth, or the year of the era, or the seventh year of Cambyses.

There was a lunar eclipse on the 15th of July concurrent with the 14th of Phamenoth, adjustment of February 26 in B.C. 531. This was the eighth year of Cyrus by the canon in its received form, counting his regnal years from the 1st of Thoth, but reckoning from a supposed accession after Phamenoth 14, this will be in a seventh year. This was also the 17th of Phamenoth by the adjustment of February 23, also in his eighth regnal year, reckoning by the 1st of Thoth, and a possible seventh year, counting from an accessional beginning. An argument derived from the conflict between the statements of Herodotus and Xenophon in reference to the Persian king who invaded Egypt, may be brought to support it as the one originally intended by the Almagest, upon the assumption that Ptolemy's statements have been tampered with to render plausible the present condition of the canon. There is another which may be connected with the seventh year of Cambyses. By reference to the table of eclipse cycles it may be seen a cycle began in B.C. 509, Cambyses's fifth year, the seventh year of which fell in B.C. 503. There was in this year a lunar eclipse on the 6th of July concurrent with the 15th of Phamenoth. This was Cambyses's last year. There are reasons for the opinion that the death of Cambyses was connected with an eclipse; his death, possibly either fifteen or one hundred and seventy-six days after the wounding of the bull, and the manner of it had reference to that of the Apis bull slain by him. The story given by Herodotus has been doubted, because Cambyses has been found represented upon the monuments worshipping the Apis bull. Dr. Brugsch's comment on this is "in other words, that the Greek story of the slaughter of the Apis by the mad Persian king is a mere fiction invented for the purpose of setting in a striking light the wickedness and oppression of the foreign tyrant."* But a different complexion is put upon the story if the "mere fiction" of it is confined to the animus of Cambyses. The Apis bulls were not permitted

* "Egypt under the Pharaohs" (Brugsch), vol. ii. chap. xix. p. 291. Eng. trans.

to live beyond a fixed period, when they were put to death. The act of Cambyses, if contrary to the prescribed rule of the Apis ritual, must be looked upon as a presumptuous innovation, and in that sense simply sacrilegious; but if it was not, he is ignorantly supposed, by slaying the bull, to have displayed an enmity towards the worship, which could not rightfully be charged against him even if his act was without sanction of law.

THE ASSYRIAN CANON COMPARED WITH THE CANON OF PTOLEMY.

Mr. George Smith adjusts the epochs of the Assyrian canon by those of Ptolemy. There is a close correspondence between the two, which in several instances fixes the epochs of certain eponyms in the Assyrian list. One of these is found in the Assyrian tablet, which mentions the first year of Sargon as king of Babylon equivalent to his thirteenth year as king of Assyria.* This in the tablet is assigned to the eponym of Mannu-Ki-assur-liha. Arkeanus in Ptolemy is Sargon. This is confirmed by the Babylonian chronicle and the second Dynastic tablet from Babylon.† By giving the eponym of Mannu-Ki-assur-liha the epoch of B.C. 709, which is that of Arkeanus in Ptolemy, all the other eponyms in a continuous series above and below this year are furnished with their epochs. It is by such a process that the eponym of Esdu-sa-rabe falls in B.C. 763. ‡ There is nothing wrong in the method; but if the epoch of Arkeanus is to be lowered nineteen years in accordance with the lowering of the era of Nabonassar, his epoch will be B.C. 690, which will bring down Esdu-sa-rabe to B.C. 744. The epoch of B.C. 763 for Esdu-sa-rabe is one advanced by Mr. Smith and others in favor of the correctness of the epochs given to the eponyms of the canon. The Assyrian Canons IV. and VII. declare the sun was eclipsed in the eponym of Esdu-sa-rabe in the month Sivan.§ A total eclipse of the sun across Central Asia has been found by modern astronomers to have been observed in B.C. 763, on the 15th of June of the Julian year, ‖ which will correspond to the 30th of Sivan in an ordinary luni-solar year beginning with a month

* "Assyrian Canon" (G. Smith), p. 86.
† "Records of the Past," New Series, vol. i.
‡ "Assyrian Canon" (G. Smith), p. 83.
§ Ibid., pp. 46, 47. ‖ Ibid., p. 83.

Nisan, which has its full moon following the vernal equinox, that point of the sun's course coming between the new moon at the beginning of Nisan and the full moon. It is possible that another eclipse of the sun was observed in B.C. 744 on the 15th of June. The presumption is enough in its favor as to require a demonstration of the contrary to be made by an exact calculation. Mr. Smith claims that the regal years in Ptolemy are all one year too low in their epochs.* Of the Assyrian practice he affirms the regal years were in most instances reckoned from the New-Year's day following the accession. He admits the custom was not uniform, and cites a number of reigns which reckoned the year of the accession as being the first year.† Professor Oppert, on the contrary, holds that the Assyrian practice was like that of all other countries in ancient and modern times, to calculate the reigns from the date of the accession.‡ In the canon of Ptolemy, for the reason that the regal years are given as complete years, and reckoned from the 1st of Thoth, the real accession must lie either before the 1st of Thoth of a first year or after it. The view that it fell before is advocated by Mr. Smith. The most reasonable view of the rule followed by Ptolemy is that he reckoned the years from the 1st of Thoth preceding the accession, and when there was an interregnum following the death of a king, which was not noticed in the list, still to count the years of the next succeeding king from the 1st of Thoth preceding his accession, and so much of the time of the interregnum as went before this 1st of Thoth was given to the previous reign. This is confirmed by the Babylonian chronicle in the case of the accession of Esarhaddon. Sennacherib, his father, was slain on the 20th of Tebet. The chronicle declares that a period of insurrection lasted from the 20th of Tebet to the 2d of Adar, and that Esarhaddon sat on the throne on the 8th of Sivan. In B.C. 661, which is Esarhaddon's epoch in Ptolemy reduced nineteen years, the vernal equinox was on the 28th of March; the full moon was on the 14th of April, about seventeen days after the vernal equinox. The preceding luni-solar year was intercalated with the additional lunar month Ve Adar.

* "Assyrian Canon" (G. Smith), p. 102. † Ibid., p. 21.
‡ Transactions Soc. Bib. Archæology, vol. vi. p. 261.

The 1st of Nisan, B.C. 661, began on the 31st of March. From the 20th of Tebet to the 2d of Adar was a period of insurrection which terminated with the supremacy of Esarhaddon on the 2d of Adar. Between the 2d of Adar and the 1st of Nisan is a period of fifty-eight days, or two lunar months, Adar and Ve Adar, *minus* one day. In B.C. 661 the 1st of March fell on the 29th of Thoth, and as the 1st of Nisan concurred with March 31, the 1st of Thoth fell before the 1st of Nisan 28 + 30 days, or fifty-eight days, which is the same number of days found to have intervened between the 2d of Adar and the 1st of Nisan; therefore the 1st of Thoth concurred with the 2d of Adar and the end of the insurrection. The accession of Esarhaddon was on the 8th of Sivan, and his regal years are reckoned from the 1st of Thoth preceding that event. This 1st of Thoth is by the adjustment of February 23, B.C. 747, the correctness of which is again confirmed.

If the list of the regnal years of Ptolemy beginning in B.C. 747 be placed side by side with one of Assyrian kings, with their epochs as determined by Mr. Smith, the twelfth year of Esarhaddon in Ptolemy falls on a line with the thirteenth and last year of Esarhaddon in the Assyrian list. According to the Babylonian chronicle, Esarhaddon reigned only twelve years. Ptolemy gives Esarhaddon thirteen years, the same number as found for him by Mr. Smith. The Babylonian chronicle bears every mark of being a carefully-prepared document, and, as far as it goes, confirms Ptolemy in every particular except for the number of years given to Esarhaddon. Ptolemy has for the third item in his list Khinzeros and Poros with a reign of five years. The Babylonian chronicle particularizes the reigns of these: Ykin-zira (Khinzeros) reigned three years and in his third year was captured by Tiglath Pileser, king of Assyria. Tiglath Pileser (Poros) succeeded to the throne of Babylon and reigned two years, dying in the month Tebet, in his second year. The chronicle assigns the two interregna in Ptolemy to the reign in Babylon of Sennacherib. If the Babylonian chronicle is right, it is a most credible witness; the reign of Esarhaddon came to an end in exactly the same year as that assigned to the last year of that king in the Assyrian canon by Mr. Smith. The thirteen years are obtained by calculating the reign one

whole year back either to the 1st of Thoth or Nisan previous to the death of Sennacherib. Mr. Smith, while adjusting the eponyms of the Assyrian canon by the epochs furnished by Ptolemy, calculates the regal years one year higher. He places Sargon's first year in B.C. 722, which will cause his fourteenth in Assyria to fall on a line with the first year of Arkeanus, and not the thirteenth year, as required by the inscription of Sargon already noticed, by means of which the Assyrian canon and the canon of Ptolemy are adjusted to each other.

Epochs of Assyrian Kings followed in this Book.

B.C. 840.	Shalmaneser,	reign 35	years.
" 805.	Samsi-vul,	" 13	"
" 792.	Vul-nirari,	" 29	"
" 763.	Shalmaneser,	" 10	"
" 753.	Assur-daan,	" 18	"
" 735.	Assur-nirari,	" 9	"
" 726.	Tugulti-paleser,	" 19	"
" 707.	Shalmaneser,	" 5	"
" 702.	Sargon,	" 17	"
" 685.	Sennacherib,	" 24	"
" 661.	Esarhaddon,	" 12	"
" 649.	Assurbanipal,	" 20	"
" 629.	Kineladinos,	" 22	"

CHAPTER XV.

POINTS OF CONTACT BETWEEN JEWISH AND EGYPTIAN HISTORY.

THE first point of contact we have to do with is the departure of the Jews from Egypt. This event is placed in B.C. 1397. The epoch of Aahmes, the Amos of Africanus, is estimated to be at B.C. 1396 by means of the age of the warrior, Pen Nukheb, who served under Aahmes, and finished his career under Thutmes III. This epoch is not too low. The events of Egyptian history preceding the reign of Aahmes are such as mark a period of disorganization and civil strife. An interregnum of disorder prevailed in Egypt. This is described in the Sallier

Papyrus,* which relates events believed to have been the beginning of the change brought about by the victorious arms of Aahmes. The opening words of the Papyrus are, "It came to pass that the land of Egypt belonged to enemies. And nobody was lord in the day when that happened."

The much-mooted question, Who was the Pharaoh "which knew not Joseph"? is probably unanswerable. If Egypt at this time was divided into petty principalities, or if the dominant power or powers in the Delta were different from that reigning in the upper parts of Egypt, the title of Pharaoh may have been claimed and borne simultaneously by more than one prince. Aahmes appears as the representative of the dynasty of Thebes. He conquers Avaris, subdues every opposing power, and assumes the sovereignty over the whole land of Egypt.

Immediately before this consummation, and probably an important aid to it, the Jews depart from Egypt, and the army of Pharaoh is overthrown in the Red Sea. The history, as far as known, requires an enmity to exist between the reigning power at Thebes and those who ruled over that part of Egypt which was assigned to the Jews for their home.

All the conditions of the story of the exodus are found in this part of the history.

Writers have claimed that the Bible statement, that Pharaoh and his army perished in the Red Sea, means not that Pharaoh himself died at this time, but that it was his army alone which came to a disastrous end. But it seems more in consonance with the Bible to place the exodus before the reign of Aahmes, because the persecution began some eighty years before the event of the exodus, and this view does not interfere with a strict construction of the account.

The next point of contact between the Egyptians and the Jews takes place in the time of Thutmes III.

This is explained in the recent controversy between W. Robertson Smith and Reginald Stuart Poole. Mr. Poole writes the following for a recent number of the *Contemporary Review*:† "More than five-and-twenty years ago M. de Rougé published

* "Egypt under the Pharaohs" (Brugsch), vol. i. p. 239. Eng. trans.

† September, 1887.

an essay on the then newly-discovered record of the campaign in which the Egyptian king, Thutmes III., defeated the great Syrian confederacy, near Megiddo, about B.C. 1600. The story is accompanied by a list of the conquered, consisting of the nations who surrendered at Megiddo, perhaps partly of towns actually taken, partly of nations or tribes subdued, but mainly of the nationality of contingents in the hostile army defeated in the first battle of Megiddo, and which afterwards surrendered. The names comprise such well-known ones as Megiddo, Damascus, Shunem, and others; it being noticeable that some names occur in a correct geographical connection, as indicating a line of march, while others do not. Among the names M. de Rougé detected Iaakab-ara, the name of Jacob, written with the subject; this is precisely like Nathan, 'he gave,' and Nathaniel, 'God gave.' An Egyptologist of the French school, M. Groff, has recently developed this argument, and also traced the name of Joseph in the list in the parallel form of Yeshep-ara. From this it would appear that about one hundred and fifty years after the rule of Joseph began, the tribes of Jacob and Joseph—the eminence of Joseph's descendants being already established—took military service out of Egypt, and with the enemies of the Egyptians. Nothing would seem more revolutionizing to Hebrew history, but nothing suffers save our ideas of what that history was." Mr. Smith replies to this in the next number of the *Review*:* "Now, even as Mr. Poole interprets the thing, it is surely a very strong argument against the antiquity of the Pentateuch that it knows nothing of so important an incident. If the Hebrews were in arms against Egypt two hundred years before the exodus, it is evident that the whole story in Exodus i. rests on extremely defective information, and has little historical value. But Mr. Poole forgets to mention that the names which he takes to be those of Jacob and Joseph occur in a 'list of the districts of Palestine which his Majesty conquered at Megiddo, and whose children he carried to Thebes.' Therefore, if there is anything in the proposed identification, there were tribes of Jacob and Joseph *settled* in Palestine two hundred years before the exodus. If these are,

* October, 1887.

as Mr. Poole supposes, the same Jacob and Joseph as we read of in the Bible, it will hardly be possible to resist the conclusion which is drawn by E. Meyer (in Stade's 'Zeitschrift' for 1886), that the sons of Jacob never were in Egypt, and that the name of Jacob originally belonged to a Palestinian tribe, one of many out of which the later nation of Israel was formed. It is right to say that Meyer is by no means confident about the identification of Yshp'r with Joseph, which in fact is open to grave philological objections,—far too grave to allow a sober historian to build on it. The other identification deserves more consideration; but to leap at once to the conclusion that the biblical Jacob is meant is, on the part of an apologetical writer, a step that shows much more courage than prudence."

In Part I. of this work it has been shown that the battle of Makitha (Megiddo) was fought on the 21st of Pachons, concurrent with April 1, B.C. 1315. This was over eighty years after the exodus of B.C. 1397. Further comment upon this supposed conflict between the Pentateuch and Egyptian monuments is unnecessary.

INVASION OF JUDAH BY SHISHAK.

In Part I. the epoch of Shishak is put at B.C. 894–886. This is obtained from the reign of Takelath II., a king of this dynasty, whose epoch is about at B.C. 846. The epoch of the first year of Shishak, calculated back from this, using data furnished by the monuments, and an average derived from the statements of Africanus and Eusebius, was about B.C. 894–886. The fifth year of Rehoboam, in which the invasion of Judah took place, is in the chronology of this work at B.C. 884.

TIRHAKAH.

Tirhakah is mentioned in the Bible in connection with the invasion of Judah by the Assyrian king Sennacherib during the reign of Hezekiah. Tirhakah begins to reign, according to the chronology, founded in part upon the Apis tablets, in B.C. 682 or 678. Hezekiah, in the chronology of this work, also begins to reign in B.C. 682. The twenty-six or more years which Tirhakah reigned place him upon the throne of Egypt at the time of the attack of Sennacherib upon Judah.

NECHO.

King Josiah endeavored to stop the mareh of Necho against Carehemish. Neeho began to reign, aeeording to the ehronology followed, in B.C. 598, and his reign eame to an end in B.C. 582. The first epoch, B.C. 598, is that of the sixteenth and seventeenth years of Josiah, and the last, B.C. 582, is that of the fourth and fifth years of Jehoiakim. His reign eovers the time of the battle at Megiddo with Josiah, and it ends at the time where the Bible plaees Neeho's defeat by Nebuehadnezzar, and the loss of "from the river of Egypt unto the river Euphrates all that pertained to the king of Egypt."

HOPHRA.

Hophra began to reign in B.C. 577, and his reign terminated in B.C. 559–560. His reign eovers the events in Jewish history with which he is eonneeted in the Bible, the year of the fall of Jerusalem eoneurring with his eleventh year.

CHAPTER XVI.

POINTS OF CONTACT BETWEEN ASSYRIAN AND JEWISH HISTORY.

SHALMANESER II.

THE first year of Saliman-uzur (Shalmaneser II.) is plaeed by Mr. George Smith at B.C. 860.* By the Assyrian eanon he was eponym in the year B.C. 858. Exaetly the thirty-first year after this (B.C. 828), Shalmaneser is again the eponym. This is confirmed by his inseription, whieh relates that he celebrated a second time a eyelieal feast in his thirty-first year.† The two eponyms are separated by thirty years. The epoeh B.C. 858 is the epoeh assumed by Mr. Smith for the third year of Shalmaneser. As Shalmaneser probably aseended the throne in the

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* "Assyrian Canon" (G. Smith), p. 199.

† "Records of the Past" (Black Obelisk), vol. v.

year previous to that of which he was the eponym, the epoch of his first year will be B.C. 859. This allows his real first year, reckoned from his accession, to be still current when he became eponym. An inscription relates that in his sixth year he was engaged in a war with Ben-hadar, of Syria, and other confederate kings. Another recounting this war informs us that the expedition was in the eponym of Dayan-assur.* The eponym of Dayan-assur is, according to the epochs given to the canon by Mr. Smith, in B.C. 854. This is the sixth year reckoned from B.C. 859. These epochs are to be reduced nineteen years to agree with the canon of Ptolemy when lowered that many. The epoch of the first year becomes B.C. 840, that of Shalmaneser's first eponym B.C. 839, that of his second B.C. 809, and that of his sixth year B.C. 835. In the Jewish chronology of this work Ahab begins to reign over Israel in B.C. 840, the same year in which Shalmaneser began. Ahaziah, the successor of Ahab, has for his epoch B.C. 824, which is that of the seventeenth of Shalmaneser. Jehoram, the successor of Ahaziah, begins in B.C. 823, which is the epoch of the eighteenth year of Shalmaneser. Jehu, who followed Jehoram on the throne of Israel, began to reign in B.C. 813; this was the epoch of the twenty-eighth year of Shalmaneser.

There are inscriptions which relate of campaigns carried on by Shalmaneser against Ben-hadar and confederate kings in his sixth, tenth, eleventh, and fourteenth years. Ahab is mentioned † in the campaign of his sixth year, which was also the sixth year of Ahab by the chronology of this work.

An inscription ‡ of the eighteenth year of Shalmaneser relates that in that year he was engaged in a war with Hazael, of Damascus, the son and successor of Ben-hadar, and concludes the description with, "In those days the Tribute of Tyre, and Zidon, and of Jehu, son of Omri, I received." The difficulty about this campaign is, the eighteenth year of Shalmaneser concurred with the first year of Jehoram, of Israel, ten years earlier than the first of Jehu. Some have doubted that the Jehu, son of Omri, of the inscription, was the same as the bib-

* "Assyrian Canon" (G. Smith), p. 106.
† Ibid. ‡ Ibid., p. 114.

lical Jehu, son of Nimshi. But they may have been the same person. The expression, "In those days the Tribute of Tyre, and Zidon, and of Jehu, son of Omri, I reeeived," points to the faet that the inseription was written some time after the event of the war with Hazael, and the tribute spoken of belongs to a period of years during which it was paid by the house of Omri, and may extend into the reign of Jehu. It is only neeessary that the time when the inseription was made should be plaeed after the beginning of the reign of Jehu. The scribe who prepares the inscription is acquainted with the fact that Jehu is on the throne of Israel, and also with the eircumstances conneeting the house of Omri with payment of tribute, and he joins the two in the inseription. Again, it may be doubted that Jehu, the son of Nimshi, ever paid any tribute to Shalmaneser; at least, if the seribe was no better aequainted with Jewish history than the one who prepared the inscription of Sennacherib's third eampaign, where Menahem, of Samaria, is mentioned as paying tribute to Sennacherib. Instead of aecusing Sennacherib of being the most mendacious of all the Assyrian kings, an excuse of ignorance might be tolerated for this kind of mistake. Further, the tribute of Menahem might have been assumed to be the eustomary tribute; the amount of one thousand talents of silver exacted from Menahem by Tiglath Pileser being submitted to not only for himself but his sueeessors upon the throne, and known under the deseriptive title of "Tribute of Menahem of Samaria." The difference between the two names Jehoram and Jehu, meaning "exalted of Jehovah" and "Jehovah is he," may be nothing more than the method adopted by the ehronieler to distinguish between two successive kings of the same kingdom; somewhat similar to the praetice followed in the ease of Jehoiakim and Jehoiachin. If it is assumed that the Assyrians were ignorant enough to suppose Jehu, the son of Nimshi, to be the son of Omri, is it any more of an assumption to suppose they were not so ignorant, but rendered the name of Jehoram as Jehu? This question is affected by the change in a name so eommon when translated or rendered by another tongue. These names are alike, and if there is any real distinction between them, it goes in with the story of Jehu's mission as the appointed instrument of the God

of Israel to punish the house of Omri; but the question is, Was there enough difference between the two to prevent a common rendering in a foreign tongue? The eighteenth of Shalmaneser has the same epoch as the first year of Jehoram. It may have been the price of his throne, or the tribute immediately levied upon him at his accession by the king of Assyria, who at that time was warring in Palestine against Hazael. It meant at that time peace and safety, things most desirable to a new sovereign, who probably did not feel strong enough to resist the demand at that time. This arrangement of the chronology is an improvement upon that required by the usual biblical chronology. By that Ahab reigned from B.C. 918 to 897, and taking B.C. 860, Mr. Smith's epoch for the first year of Shalmaneser, Ahab had ceased to reign thirty-seven years before the accession of Shalmaneser. Professor Oppert, in order to bring Shalmaneser within the possibilities of the inscriptions, supposes there was a break in the Assyrian canon at the year in which Tiglath Pilcser ascends the throne, and inserts forty-seven years, thereby raising Shalmaneser's epochs that many years.*

TIGLATH PILESER.

Azariah, king of Judah, and the tribute of Menahem of Samaria are mentioned in an inscription† of Tiglath Pileser. Probable date, according to Mr. Smith, B.C. 738; this reduced nineteen years is B.C. 719, in which year fell the eighth year of Tiglath Pileser. B.C. 719 is the epoch of the 38–39 years of Azariah and also of the first year of Menahem. The Bible‡ in the case of Menahem describes exactly the condition of things I have supposed to exist at the accession of Jehoram and his payment of tribute to Shalmaneser. "And Pul, king of Assyria, came against the land: and Menahem gave Pul a thousand talents of silver, that his hand might be with him to confirm the kingdom in his hand." Another inscription of Tiglath Pileser mentions Rezin of Syria, who is associated in the Bible with Pekah in a war upon Judah.§ Another mentions Jehoahaz

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* "Assyrian Canon" (G. Smith), pp. 5, 75. † Ibid., p. 117.

‡ II. Kings xv. 19.

§ "Assyrian Canon" (G. Smith), p. 116.

of Judah.* No king of exactly this name was on the throne of Judah at this time. By the chronology of this book, Azariah and Jotham were the kings reigning in Judah during the reign of Tiglath Pileser. Ahaz, who succeeds Jotham, has for his name the last portion of that of Jehoahaz, and Assyrian scholars have identified Jehoahaz as Ahaz. The name Yahu-Khazi, which is translated Jehoahaz, and understood to mean Ahaz, contains as its first element Yahu; this is almost identical, if the variation is of any account, with Yahua, which is translated Jehu in the inscription of Shalmaneser II. It has been noticed that the Hebrew chronicler distinguishes two successive kings who bore the same name by a change which affected the form rather than the meaning of the name. Jehoahaz means "Whom Jehovah holds or possesses," and Ahaz means "Possessor," and Jotham, "Jehovah is upright." In the two names, Jotham and Ahaz, there is all that there is in Jehoahaz, and they may be modified forms of Jehoahaz, and purposely so, in order to distinguish the two kings, one from the other, the real name of each being Jehoahaz. Another inscription of Tiglath Pileser has the following reference to Pekah and Hoshea. "Pekah their king . . . and Hoshea to the kingdom over them I appointed . . . their tribute I received and . . . to Assyria I sent." † This would, at first sight, seem to imply, as Hoshea began to reign in the twelfth year of Ahaz, that the Jehoahaz of the inscription was the Ahaz of the Bible. This would extend the bounds of the reign of Tiglath Pileser beyond those laid down in the Assyrian canon. To bring Hoshea within the limits, and to uphold the Bible statements and to confirm the inscription, a different construction must be put upon the history than that hitherto given to it. The death of Tiglath Pileser is placed by the Babylonian chronicle in the last year of his reign as king of Babylon, which corresponds to that of Poros in the canon of Ptolemy, B.C. 727, which, reduced nineteen years, becomes B.C. 708. This is the year, according to the chronology of this book, in which Pekahiah ceased and Pekah began to reign; this was also the epoch of the first year of Jotham. It is not clear always whether Tiglath Pileser refers

* "Assyrian Canon" (G. Smith), p. 124. † Ibid., pp. 123, 124.

to Pekahiah or Pekah in the inscriptions, or whether both are mentioned. Pekaha is the Assyrian form for the names of these kings. Pekahiah succeeded his father Menahem upon the throne of Israel, and after a reign of over one year he was slain by Pekah, a captain of his, who seized the throne. In the days of Pekah, Tiglath Pileser, king of Assyria, took Ijon and other cities, and all the land of Naphtali, and carried them captive to Assyria.* Hoshea, the son of Elah, conspired against Pekah and slew him in the twentieth year of Jotham, and reigned in his stead.† Pekah reigned twenty years. This statement of the death of Pekah is based upon the twenty years given to Pekah in the Bible. As Jotham began to reign in the second year of Pekah, his twentieth year will overlap the first year of his successor, Ahaz. The inference without a contrary statement would be that Hoshea obtained the throne of Israel at this time, but the Bible states that Hoshea began to reign over Israel in the twelfth year of Ahaz, and we must conclude that between the first and twelfth years of Ahaz there was an interregnum in Israel. During this interregnum Hoshea was probably struggling to obtain the throne. It appears that from the first year of Pekah, B.C. 708, unto the twelfth year of Ahaz, B.C. 683, a period of twenty-five years, Hoshea had been contending for the throne of Israel. Tiglath Pileser, in the extract given of the much-mutilated inscription, mentions Pekah and the appointment of Hoshea to the throne. Tiglath Pileser dies in this year. Under a temporary reverse of fortune Pekah loses his throne, and Hoshea is appointed to the same by the king of Assyria. The account leaves us in ignorance of the history of Pekah during this temporary elevation of Hoshea. Of Hoshea we learn that Shalmaneser, the successor of Tiglath Pileser, came against him, and Hoshea became his servant, and gave him presents, which is an euphemism for the payment of tribute. After this the king of Assyria detected Hoshea in a conspiracy with So, king of Egypt, and because the king of Israel brought no presents, as he had done year by year, he put him in prison.‡ Shalmaneser reigned five years and was over-

* II. Kings xv. 29. † Ibid., xv. 30.
‡ Ibid., xvii. 3, 4, 5.

thrown by Sargon, a general of his, who seized the throne of Assyria. Sargon captured Samaria in the beginning of his reign.* The capture of Samaria, the usurpation of Sargon, and the imprisonment of Hoshea are events which possibly lie together. The overthrow of Hoshea, at this time, was the opportunity for Pekah to regain his throne. The Bible, while relating events concerning Hoshea which happened before the twelfth year of Ahaz, does not chronologically recognize his reign until that time. Sargon begins his reign in B.C. 702, and in this year we may suppose Pekah regained his throne. Hoshea in some way obtains his liberty, and slays Pekah in the twentieth year of Jotham, B.C. 692. From this point down to the twelfth year of Ahaz was an interregnum. What the political condition was at this time may be learned from the Book of Hosea.† "When Ephraim saw his sickness, and Judah saw his wound, then went Ephraim to the Assyrian, and sent to king Jareb: yet could he not heal you, nor cure you of your wound." Understanding this to refer to the attacks of Israel upon Judah, and to the civil war prevailing in Israel, it is in further illustration of the history at this time, by allusion to Sennacherib, king of Assyria. The Assyrian name of Sennacherib was Sin-ahi-iriba. This is abbreviated, and only the last element, Iriba, is retained, which is rendered in Hosea as Iareb. By the help of the Assyrians, Hoshea is at last established upon the throne of Israel in the twelfth year of Ahaz. But this brought no cure to the wound of Ephraim. The taint of disloyalty and faithlessness was greater than the physician's art of healing.

It is not known how many sieges Samaria suffered during this period. The effect of the Assyrian arms in the conquest of Palestine was not permanent towards submissiveness. Expedition follows expedition, and conquests have to be made over and over again. The deportation of the inhabitants of the land may have served a double purpose, the not least one being the removal of an incorrigibly rebellious people.

The fall of Samaria, connected with the last year of Hoshea, is placed in this work in B.C. 675.

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* "Assyrian Canon" (G. Smith), p. 215.

† Hosea v. 13.

SENNACHERIB AND HEZEKIAH.

The history of the reign of Hezekiah is found in separate paragraphs, the natural result of summing up in a page or two the principal facts of a long and eventful reign. On this account their natural continuity is destroyed. Between some of these there is no connection other than that they are placed in juxtaposition in the story. The inference is the events so happened, for it is customary to relate such in their due order of time. The account reads as if there was but one expedition made by Sennacherib against Hezekiah, but unless the king of Assyria made two different attacks upon Hezekiah the story is inconsistent in one important detail. In II. Kings xviii. we are told Sennacherib invaded Judah in the fourteenth year of Hezekiah, and the king of Judah made submission and handed over to the Assyrian king all the treasures of his house, and the Lord's house, even to the stripping from the doors and pillars of the temple the gold with which they were overlaid. This is next followed by the account of the messengers from the king of Assyria, their outrageous and insulting language, and their efforts to intimidate the people. Hezekiah resorts to prayer and the intercession of Isaiah to save him and the city. Nothing is said of Sennacherib's broken faith in renewing his demands after he had received the entire contents of the royal and temple treasuries. This is followed by the miraculous destruction of Sennacherib's army. Then comes the sickness of Hezekiah. This is connected with the attack of Sennacherib, because Isaiah, when he cures Hezekiah, assures him of the safety of the city from the attack of Sennacherib and promises him he shall live fifteen years more. These fifteen, counting both extremes, follow the fourteenth year of Hezekiah; they with the fourteen make up the twenty-nine years Hezekiah reigned. Following this comes the account of the letters and presents from Berodach-baladan, son of Baladan, king of Babylon, which were sent, we are told, "for he had heard that Hezekiah had been sick." Hezekiah displays before the ambassadors from Babylon "the house of his precious things, the silver, and the gold," etc. The inconsistency here is, if Hezekiah had given to Sennacherib all his treasure in his fourteenth year, there was nothing left

worthy of the name, or for a vainglorious display to excite the wondering admiration of the strangers from afar, or to give occasion for Isaiah to utter the prophecy of the evil results to flow therefrom. There is no doubt of the fact by itself, but taken as related and in its juxtaposition it was impossible. The account in II. Chronicles, although in most particulars like that in II. Kings, differs from it in the omission of all account of the tribute, and in the spirit which is made to actuate Hezekiah. In II. Kings he is timid, in II. Chronicles he is courageous; in II. Kings he submits and pays the tribute, in II. Chronicles he sets about fortifying the city and encourages the people. The account of the messengers from Babylon is different. They are not sent by Berodach-baladan, but by the princes of Babylon, and no mention of Hezekiah's sickness is made in that connection; it is said they came to inquire of the wonder done in the land.

If Sennacherib made two expeditions into Judea, which is the view held by critics and Biblical scholars, these inconsistencies, so far as they are material, are removed, and those which are immaterial, arising as they do from a misapprehension of the sequence of the events, are to be explained in that way. The inscription of Sennacherib, which gives an account of his third and fourth campaigns, confirms the matter of the tribute. Sennacherib declares "He himself (Hezekiah), like a bird in a cage, inside Jerusalem, his royal city, I shut him up: siege-towers against him I constructed (for he had given commands to renew the bulwarks of the great gate of his city)." . . . "He himself, Hezekiah, the fearful splendour of my majesty had overwhelmed him. The workmen, soldiers, and builders, whom for the fortifications of Jerusalem his royal city he had collected within it, now carried tribute, and with thirty talents of gold, eight hundred talents of silver" . . . "after me he sent; and to pay tribute, and do homage he sent his envoy."* This from the Assyrian inscription confirms the account in II. Chronicles as to the courage with which Hezekiah first met the attack of Sennacherib. It even goes to confirm a particular detail of the new fortifications made by Hezekiah. The inscription says, "for

* "Assyrian Canon" (G. Smith), p. 135. "Records of the Past," vol. i.

he had given commands to renew the bulwarks of the great gate of his city," and in II. Chronicles we are told that Hezekiah built up the broken-down walls and raised the towers higher. The matter of the tribute related in II. Kings is confirmed to the exact amount of the gold, and the difference in the silver between the three hundred talents of II. Kings and the eight hundred talents of the inscription may be explained, until more is known of the matter, by the various values put upon the denominations of silver.

The account in II. Kings, which is connected with the destruction of Sennacherib's army, declares, in answer to Hezekiah's prayer, "the king of Assyria, He shall not come into this city, nor shoot an arrow there, nor come before it with shield, nor cast a bank against it."* This is repeated word for word in the narrative found in Isaiah. If this is understood to refer to the attack upon Jerusalem, mentioned by Sennacherib in his inscription, it is in direct contradiction of it, for that as quoted relates that Sennacherib shut up Hezekiah in his royal city; that is, laid siege to it, and siege-towers were constructed. It is possible to reform the history so as to allow of two attacks by Sennacherib upon Hezekiah from its own internal evidence. The first attack was that connected with the tribute. The second invasion of Judah was when Sennacherib sent Tartan, Rabsaris, and Rab-shakeh to intimidate him, and to demand pledges and more tribute money. At this time Sennacherib did not come near the city of Jerusalem, but hearing that Tirhakah had come out of Egypt against him, he turns his attention to his new enemy. The Egyptians stated to Herodotus, as he has recorded in his history,† that when the Assyrian army was encamped opposite their own, in the night a multitude of field-mice invaded the Assyrian camp and devoured the quivers and bow-strings and the thongs of the shields of the Assyrians, and maybe included in this all things of their equipment made of leather. The Assyrian army in this predicament was practically what a modern army would be without gunpowder. Such an invasion of rodents was nothing extraordinary, as those who have made themselves familiar with the habits of

* II. Kings xix. 32. † Book II. 141.

these animals testify. The means by which the defeat of Sennacherib was brought about were those known as natural or second causes; but the deliverance was none the less one of those usually described as miraculous. In the morning, when the Assyrians discovered the condition they were in, they took to flight, and great multitudes of them were slain. In II. Kings the manner of the destruction is described: "And it came to pass that night, that the angel of the Lord went out, and smote in the camp of the Assyrians a hundred fourscore and five thousand: and when they arose early in the morning, behold, they were all dead corpses."* This is an additional fact, and not inconsistent with the Egyptian narrative. From the narrative of this last attack upon Judah by Sennacherib, it is learned that this event was connected with a sabbatical year.

I am aware it has been argued that the words spoken by Isaiah to Hezekiah, "And this shall be a sign unto thee, Ye shall eat this year such things as grow of themselves, and in the second year that which springeth of the same; and in the third year sow ye, and reap, and plant vineyards, and eat the fruits thereof,"† could not mean this was a regular sabbatical year, or why would it be a sign more than any other sabbatical year? It appears the sabbatical years instituted by Moses were not regularly observed by the Jews, and it may have been one of the reforms of Hezekiah to have them observed. The words of Isaiah describe something more than a sabbatical year. According to the command of Moses they were to refrain from all servile work during the sabbatical year. This necessitated the year preceding the sabbatical year should bear fruit for three years; that is, for the incomplete part of itself that followed one of the two principal harvests of the year, for the sabbatical year, and for the year following the sabbatical, until they reaped the harvests planted in that year. Isaiah describes something different. There were to be two successive years having all the characteristics of a sabbatical year, and the former year, if famine is to be avoided, would have to bear fruit to last four years, unless Hezekiah had provided in advance storehouses in which was kept the overplus produce of pre-

* II. Kings xix. 35.

† Ibid., xix. 29.

vious years. This is what Hezekiah is said to have done.* If Sennacherib invaded Judah in the year preceding a sabbatical year, of necessity, the land being overrun by his army, and those who cultivate the soil having taken refuge in the walled cities, the year would be a failure in an agricultural sense. The following year being sabbatical, no agricultural pursuits would be followed. This describes the condition of things which Isaiah said was to be a sign. Of what was it a sign? Not of the defeat of Sennacherib; but what follows in explanation is meant, "And the remnant that is escaped of the house of Judah shall yet again take root downward, and bear fruit upward." The metaphor is borrowed from the circumstances attending the two years in which no planting of the earth was to be done, followed by one in which a renewal of the processes of agriculture should take place. It is well known that the enemies of the Jews took occasion on the sabbath to gain certain advantages, which a strict observance of that day on the part of the Jews permitted them to take. Josephus† writes, that although the Jews were allowed to defend themselves when attacked on the sabbath day, yet they were forbidden to interfere with any other proceeding of the enemy which did not amount to a personal collision. He writes, this was discovered by the soldiers of Pompey in their attack upon the fortifications of the temple, so that on the sabbath day they refrained from attacking the Jews, but used the time in preparing, unmolested, the engines of war, and placing them in position ready for the attack on the next day. Thus they were enabled to prepare the means by which the walls were beaten down and the citadel taken. Similar facts are related of the capture of Jerusalem by Ptolemy‡ and Herod.§ The prohibition applies with the same force to the sabbatical year, and all days in which servile work was forbidden. The succession of sabbatical years, it is reasonable to suppose, was reckoned from some epoch. The era of the tabernacle was in B.C. 1396, and reckoning from

* II. Chron. xxxi. 11.

† "Antiquities of the Jews" (Josephus), Book XII. vi. 2.

‡ Ibid., Book XIV. iv. 2.

§ Ibid., xvi. 2.

this down to B.C. 676 is a period of seven hundred and twenty years, which contains one hundred and twenty sabbatical weeks of years, each of six years of twelve months, or seven mixed years (one of twelve months and six of ten months). These years in Hezekiah's reign will be those of his seventh year, B.C. 676–675; his fourteenth year, 670–669; his twenty-first year, 664–663; his twenty-eighth year, 658–657. The epoch of the first year of Sennacherib is obtained as following the last year of Sargon, determined by his last year as king of Babylon, Sargon being the same as Arkeanus in Ptolemy's canon. This is Ptolemy's epoch of the first year of the first interregnum reduced nineteen years.

The first attack may be placed in the first year of Hezekiah. This was the third campaign of Sennacherib described in the inscription, when he shut up Hezekiah in Jerusalem like a bird in a cage.

Sennacherib in his next campaign, which is a continuation of that into Judea,* sets up Assur-nardin-suma, his son, as king in Babylon. This was in B.C. 680, and in the first year of Hezekiah. This is an important confirmation of the chronology, because B.C. 680 is the epoch of Aparanadius, who is Assur-nardin-suma, in the canon of Ptolemy when it is reduced nineteen years, from B.C. 699 to 680. At this time Hezekiah paid the tribute to Sennacherib. The messengers from the king of Babylon may have visited Hezekiah just before the attack of Sennacherib, when it would be possible for Hezekiah to show them his treasures. But this need not be insisted upon: the interval of thirteen years between the first attack and the second in the fourteenth year of Hezekiah is long enough, with a very prosperous reign, to accumulate much treasure. Were it not for the statement of the Assyrian inscription of the elevation to the throne of Babylon of Assur-nardin-suma as following the attack upon Hezekiah, the first attack might be placed in the seventh year of Hezekiah, the first sabbatical year of his reign. This might be the case if there is liberty to suppose Assur-nardin-suma, who had been put on the throne of Babylon in B.C. 680, was in the seventh year of Hezekiah temporarily

* "Records of the Past," vol. i.

without a throne, and the fourth expedition had for one of its ends the restoration of Assur-nardin-suma to the throne of Babylon. This is so far borne out by the Babylonian chronicle, which informs us that Assur-nardin-suma was in his sixth year captured by Kallasu, king of Elam, and carried to Elam. The sixth year of Assur-nardin-suma falls in with the seventh year of Hezekiah, B.C. 675. The supposition that Sennacherib restored him to his throne by the campaign of the following year may be tenable, for the king of Elam placed Nergel-Zusczib upon the throne of Babylon, and he answers to Regebelos in Ptolemy's canon, and Sennacherib mentions this prince as Suzub in the inscription of this campaign as he who had stirred up the revolt in Babylonia. It stands in with this, that this was only a temporary success of Sennacherib, because for the next four years the Babylonians have on the throne one of their own princes, Musezib-Merodach (Babylonian chronicle), the Mesesimordakus of the canon. This will allow Hezekiah a sufficient time in his sixth year to undertake to fortify the city. This also finds Sennacherib in Palestine at this time, for the fall of Samaria was in the sixth year of Hezekiah. The visit of the messengers from the king or princes of Babylon was before these events. Nevertheless the first view follows more closely the biblical account, and there will be time enough to begin the fortifications, and to have some of them finished, before Sennacherib began the siege in the first year of Hezekiah.

The second attack was in the thirteenth and fourteenth years of Hezekiah and the sixteenth and seventeenth years of Sennacherib. The Assyrian king enters Judea in the year preceding a sabbatical year. Hezekiah is prevented by this circumstance from making a proper defence. Now, if ever, is to be tested the wisdom of the law against offensive warfare in the sabbatical year. Those who deny the miraculous in the Bible admit the historical facts, and claim the miracle is superimposed upon them. In the case of Hezekiah at this time the very facts themselves demand a miracle. Jerusalem is saved and the army of Sennacherib destroyed by the angel of the Lord. In the following year Hezekiah is sick and near to die. This is also the year of the eclipse of B.C. 669. After this messengers come from the princes of Babylon to inquire of the wonder

done in the land. Hezekiah shows them his riches, and the story of them is carried back to Babylon, and is not forgotten. The prophetic words of Isaiah are to be fulfilled by Nebuchadnezzar. Some have supposed the death of Sennacherib followed closely upon the destruction of his army in the thirteenth–fourteenth year of Hezekiah. The Bible states that he went and dwelt in Nineveh, where he was slain by two of his sons.* The Assyrian canon mentions no expeditions of Sennacherib in his later years, and the inference of his death earlier than required by the canon is simply gratuitous.

CHAPTER XVII.

JEWISH HISTORY IN CONNECTION WITH THE HISTORIES OF BABYLON AND PERSIA.

Josiah, king of Judah, died after a reign of thirty-one years. His death was caused by a wound received in the battle of Megiddo, fought with Necho, king of Egypt, who was at that time engaged in a campaign against Charchemish, by the river Euphrates.

Jehoahaz succeeded his father, Josiah, and reigned three months. Necho, after the capture of Charchemish, marched to Jerusalem, deposed Jehoahaz, and elevated Jehoiakim to the throne, who reigned eleven years.

About the time of the accession of Jehoiakim, Nebuchadnezzar, king of Babylon, commanded an expedition to recover Charchemish and the provinces of Syria and Palestine. According to Berosus, Nabopolassar sent his son Nebuchadnezzar against Necho. Nebuchadnezzar is called king of Babylon before the death of his father, who, in II. Kings xxiii. 29, is styled the king of Assyria. The giving Nebuchadnezzar the title king of Babylon before the death of his father has been explained to be "a *prolepsis* common to most writers of history." †

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* II. Kings xix. 7, 37.

† "Historical Illustrations of the Old Testament" (Rawlinson), p. 169.

But it would not be out of the ordinary if the two titles, king of Assyria and king of Babylon,* were still fashionable, and the lesser one, king of Babylon, bestowed on Nebuchadnezzar, the heir of the throne. It is probable, as the Bible declares the expedition of Necho against Charchemish to be against the king of Assyria,† the empire was still called Assyrian. During the subsequent reign of Nebuchadnezzar, Babylon grew in power and surpassed the glories of Assyria, which were now beginning to be forgotten in the splendor of the new kingdom. We hear no more of the king of Assyria; it is now Nebuchadnezzar, king of Babylon, the great king.

The following historical statements are connected with the reign of Nebuchadnezzar in the Bible:

The capture of Jerusalem in the third year of Jehoiakim.‡

The first year of Nebuchadnezzar was the fourth year of Jehoiakim.§

Nebuchadnezzar carried captives from Jerusalem in his seventh, eighteenth, and twenty-third years.‖

The temple at Jerusalem was destroyed in the nineteenth year of Nebuchadnezzar.¶

The thirty-seventh year of the captivity of Jehoiachin was the first year of Evil Merodach.**

All these statements are carried out in the chronological table except that of the captivity of the seventh year of Nebuchadnezzar, which is omitted, and one of the third year of Jehoiakim is inserted in its place.

The years of Nebuchadnezzar's sole reign are reckoned in years of ten months from the fourth year of Jehoiakim, which causes a thirty-seventh year to fall in with the first year of Evil Merodach, and if the captivity of Jehoiachin began from the siege of Jerusalem in the third year of Jehoiakim,†† the thirty-seventh year thereof, by the year of ten months, will concur with the first year of Evil Merodach. This is not the usual explanation of this statement in the Bible. Daniel, in the be-

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* "The Ancient Empires of the East" (Sayce), pp. 134, 139.
† II. Kings xxiii. 29. ‡ Daniel i. 1.
§ Jeremiah xxv. 1. ‖ Ibid., lii. 28, 29, 30.
¶ Ibid., lii. 12. ** Ibid., lii. 31. †† Daniel i. 1.

ginning of the book bearing his name, states that "the king spake unto Ashpenaz the master of his eunuchs, that he should bring certain of the children of Israel, and of the king's seed, and of the princes." The presence in Babylon of Jehoiachin, the son of Jehoiakim, is predicated upon this statement. Jehoiachin is not mentioned in this connection, but his presence in Babylon at this time as a hostage for the fealty of Jehoiakim, his father, and also to be brought up under Chaldean influence and moulded to the will of Nebuchadnezzar, is a matter of such plain policy and common practice that it requires no apology. When Nebuchadnezzar is forced to remove Jehoiakim from the throne he elevates Jehoiachin in his father's place, but becoming dissatisfied, he removes Jehoiachin after a reign of three months, and places his uncle, Zedekiah, upon the throne. This second captivity of Jehoiachin, if we may be allowed to distinguish between the two only separated by a few months, is the one usually followed, and it is the one during which he suffered the rigors of imprisonment. This allows of two reckonings of the captivity, one of the first year of Nebuchadnezzar's sole reign and the other of the eighth year. For reasons connected with the chronological scheme as a whole, the captivity of Jehoiachin in connection with the first year of Nebuchadnezzar's sole reign is followed.

The statements of Josephus, though believed to be full of errors, suggest what appears to be the correct chronology down to the proclamation of Cyrus. In "Antiquities of the Jews" he writes, "In the first year of Cyrus, which was the seventieth from the day that our people were removed out of their own land into Babylon." * In his dissertation against Apion occurs: "These accounts agree with true history in our books: for in them it is written that Nebuchadnezzar in the nineteenth year of his reign laid our temple desolate, and so it lay in that state of obscurity for fifty years; but that in the second year of Cyrus its foundations were laid, and it was finished again in the second year of Darius." † At another place in the same he states, "When it so happened that our city was desolate during

* "Antiquities of the Jews" (Josephus), Book XI. i. 1.

† "Against Apion" (Josephus), Book I. 21.

the interval of seventy years until the days of Cyrus, king of Persia."* Ptolemy's canon gives forty-nine years from the destruction of the temple in the nineteenth year of Nebuchadnezzar to the second year of Cyrus. Josephus counts both extremes and calls the interval fifty years. To complete the period of seventy years he first mentions, he must count it from the captivity of the third year of Jehoiakim, and beginning Nebuchadnezzar's first year with the fourth year of Jehoiakim, he obtains $1 + 19 + 50$ for the seventy years from the day his people were removed out of their land unto the first year of Cyrus. The number 19 should be 18, and the seventy years counted to the second year of Cyrus, as in the second quotation. In the third quotation from Josephus his words are, "Our city was desolate during the interval of seventy years, until the days of Cyrus, king of Persia." If this period is the same as the first quotation's, it is strange he uses language which applies more truthfully to the destruction of Jerusalem, which he states was only fifty years before the second of Cyrus. Josephus's chronology of this period differs from the canon of Ptolemy. He gives Nebuchadnezzar forty-three years; Evil Merodach, eighteen years; Neglessar, forty years; Labosordacus, nine months; Baltasar, called Naboandelus, seventeen years. Against this latter, he says, came Cyrus, king of Persia, and Darius, the Mede.† Counting from the first of Nebuchadnezzar to the end of Baltasar are one hundred and eighteen *plus* years. I have emended the canon of Ptolemy in a way which brings the first of Nebuchadnezzar to B.C. 595. His sole reign begins in B.C. 583, in part current with his thirteenth year of twelve months, reckoned from B.C. 595. If the figures furnished by Josephus are from the time Nebuchadnezzar became king of Babylon, then twelve years are to be deducted from one hundred and eighteen to get the term from the fourth of Jehoiakim or Nebuchadnezzar's sole reign; this will leave one hundred and six years, and this, less seventy years for the captivity, leaves a remainder of thirty-six years, nine months, which is the term of Darius Hystaspes's reign. With this view Josephus places the capture of Babylon

* "Against Apion" (Josephus), Book I. 19.

† "Antiquities of the Jews" (Josephus), Book X. xi. 2.

and the death of Baltasar at the end of Darius Hystaspes's reign, and the end of the seventy years' captivity at the beginning of Darius's reign. The account of the death of Baltasar (Belshazzar) closes Book X. of the "Antiquities of the Jews." The next book, the eleventh, opens with an account of the proclamation of Cyrus, similar to that in the Book of Ezra, for the return of the Jews to Jerusalem and the rebuilding of the temple. Mention is made in this proclamation of the restoration of the vessels of the Lord removed by Nebuchadnezzar from the temple, and which had been brought to Belshazzar during his revels on the night the city was taken. The successor of Darius Hystaspes was Xerxes, therefore Xerxes was the Cyrus who made the proclamation. This is a conclusion not intended by Josephus, but one compelled by his figures, one object of which was probably to account for the age of Darius Hystaspes at the capture of Babylon, which is said to have been sixty-two years.* Herodotus mentions in connection with a narrative of a dream of Cyrus concerning Darius, that the latter was twenty years old and too young to go to war.† This time is placed by the death of Cyrus as falling in his last year. By the canon, Cambyses reigns eight years and Darius Hystaspes thirty-six years, consequently Darius Hystaspes was $20 + 8 + 36$ years old at the time of his death, or sixty-four years old. This places the death of Baltasar in the thirty-fourth year of Darius, when he was sixty-two years old. This again suggests Xerxes as the Cyrus who issued the proclamation.

In the explanation of the cycles of eclipses, which are to be found in the Persian portion of the canon as amended, a cycle, of which Xerxes is supposed to be the eponym, is begun with the thirty-first year of Darius, and for six years it overlaps the reign of Darius, and covers the eight years' sole reign of Xerxes and extends for five years into the reign of Artaxerxes. This accounts for the association of Cyrus, the Persian (Xerxes), with Darius Hystaspes in the capture of the city. If this person had been Cyrus the Great, he would not have been a subordinate of Darius, as the narrative implies. We must explain Josephus's account, as well as that of the Bible, by giving

* Daniel v. 31.

† Herodotus, Book I. 209.

to the name of Cyrus a more general application. This name was that of the founder of the Persian monarchy, and it was also bestowed upon Xerxes. The name Xerxes is said to mean king, and the name Cyrus may bear a similar meaning and one in origin like that of Pharaoh, "the great house."* Although Cyrus, the founder of the Persian monarchy, was a real person, many of the stories about him are of a legendary character. A comparison between the legend of Perseus, whose son Perses was the patronymic of the Persians, might lead to the impression that a name for Cyrus was Perseus (*per — aa = curia*). In this legend the circumstances attending the birth and infancy of Perseus are so like those told of Cyrus that the coincidence cannot escape attention. When to this is added the similarity of the names of the personages connected with the two stories, but one conclusion is reached, that under the guise of the legend of Perseus the Greeks preserved some of the incidents of the life of Cyrus. Perseus, when he reaches man's estate, is sent by Polydectes, his preserver, who now wishes to be rid of him, to slay the gorgon Medusa. On his return from that expedition, he rescues Andromeda from a sea-monster, by whom he became the father of Perses. From the dead body of Medusa sprang the winged horse Pegasus, from the imprint of whose hoofs welled up the springs of Helicon. Perseus finally returns with his mother to Argos. His grandfather, Acrisius, flies to Larissa. Thither Perseus follows to persuade the king to return home, and while there accidentally killed him with a discus during the progress of certain games celebrated in honor of Acrisius by the king of that country. Comparing these names with those found in the story of Cyrus we have—

Astyages.	Acrisius.
Mandané.	Danaë.
Cyrus.	Perseus.
Medes.	Medusa, Andromeda.
Persians.	Perses.
Harpagus.	Pegasus.

But the most noticeable verification of the connection between

* "Dictionnaire d'Archéologie Égyptienne" (Pierret), *Pharaon*.

the two stories is the total solar eclipse at Larissa, where Acrisius was slain with a discus by Perseus. This eclipse is placed by Xenophon about at the time of the conquest of the Medes by the Persians.

Two conclusions may be drawn from the circumstances found in Josephus and Herodotus. First, in Josephus, two distinct and opposing chronologies are found, one of which is similar to that found in the canon of Ptolemy, and the other confirms the reformation of the canon, as proposed in this work, in so far as Nebuchadnezzar's forty-three years should begin at an epoch twelve years before the fourth year of Jehoiakim. Second, the name Cyrus was one also applied to Xerxes.

The Book of Ezra opens with the proclamation of Cyrus. It is proposed to show from the list of Persian kings therein found that by Cyrus was meant Xerxes. The order of these kings, as gathered from this book, is Cyrus,* Ahasuerus,† Artaxerxes,‡ Darius,§ Artaxerxes.‖ There are two ways of comparing this list of Persian kings with that portion of Ptolemy's canon in which they are found: one, to begin by comparing Cyrus of the Book of Ezra with the Cyrus of the canon; the other, to begin by comparing the last of the four kings of Ezra with a corresponding king in the canon and to let Cyrus fall where he may. By the first plan it is necessary to insert the Magian impostor under the name of Smerdis or Bardis,¶ who only reigned a few months, and whose time is included in the canon in the reigns of Cambyses and Darius Hystaspes. The list from the canon, amended by the insertion of Smerdis and compared with the kings in Ezra, is as follows:

Canon.	Ezra.
Cyrus.	Cyrus.
Cambyses.	Ahasuerus.
(Smerdis.)	Artaxerxes.
Darius Hystaspes.	Darius.
Xerxes.	
Artaxerxes.	Artaxerxes.

* Ezra iv. 5. † Ibid., iv. 6. ‡ Ibid., iv. 7.

§ Ibid., iv. 5; vi. 15. ‖ Ibid., vii. 1.

¶ "Historical Illustrations of the Old Testament" (Rawlinson), pp. 192, 193.

This identification requires the hypothesis that Cambyses was called Ahasuerus (that is, Xerxes) and Smerdis Artaxerxes, while no explanation is known for the omission of Xerxes in his proper place. To favor this arrangement there is no other argument than that it is done to make the Cyrus of Ezra to be the same as the Cyrus of the canon. On the other hand, notice how perfectly the last four kings agree with four from the canon:

Canon.	Ezra.
Darius Hystaspes.	Cyrus (Xerxes).
Xerxes.	Ahasuerus (Xerxes).
Artaxerxes.	Artaxerxes.
Darius Nothus.	Darius.
Artaxerxes Mnemon.	Artaxerxes.

Cyrus is brought on a line with Darius Hystaspes, but this is due to a wrong apprehension of Ezra. In the fourth chapter of Ezra it is said counsellors were hired to frustrate the purpose of the Jews in the rebuilding of their city and temple "all the days of Cyrus, king of Persia, even until the reign of Darius, king of Persia. And in the reign of Ahasuerus, in the beginning of his reign." . . . "And in the days of Artaxerxes." If it is understood that the circumstances first mentioned referred to the whole time delays were thrown in the way of the Jews, then from the first year of Cyrus (Xerxes) covers the reigns of Ahasuerus (Xerxes) and Artaxerxes (Longimanus), the Darius mentioned being Darius Nothus, the successor of Longimanus, and not Darius Hystaspes. The historian, after mentioning the time of the whole duration of the persecution as beginning with the reign of Cyrus (Xerxes) and terminating with that of Darius, begins a more detailed account. Of these events he was not a personal witness, but derives his knowledge from the Jews who had gone before him to Jerusalem. Xerxes was called by them Ahasuerus, and according to the view now set forth he was known to the Persians under the name of Cyrus. This king is mentioned first after the general description of the persecution, his part in it is the first detail, and his place is the same as that of Cyrus (Xerxes). The last sentence of the fourth chapter of Ezra tells us the work ceased unto the second year of Darius, king of Persia, and in the sixth chapter we are

informed the house was finished in the sixth year of this king. Ezra goes to Jerusalem in the seventh year of the reign of Artaxerxes, who was the Persian king who was called Mnemon; this was in the year B.C. 399. In the twentieth year of this same king, B.C. 386, Nehemiah obtains permission to go to Jerusalem to rebuild the city. A period of four hundred and twenty years from this time will end A.D. 33. The list of high-priests agrees perfectly with this arrangement. Jeshua holds this office at the time of the proclamation of Cyrus (Xerxes). The three mentioned in this portion of the history are Jeshua, Joakim, and Eliashib. The notice of Joakim is confined to his name simply, but Eliashib was high-priest in the twentieth year of Artaxerxes. This will come about whether we give to their terms of office the number of years usually found in chronologies or average them at thirty or thirty-three and one-third years each.

In the chronological table I have given the years of only three of the terms of captivity, reckoning seventy years to each. This is necessary in order to identify the points from which these terms begin. The first has for its epoch B.C. 583; it begins with the captivity of the third year of Jehoiakim, when Daniel and certain of the children of Israel and of the king's seed were carried to Babylon. The second begins with the destruction of Jerusalem, and the third with the last deportation of the Jews by Nebuchadnezzar in the twenty-third year of his reign. It is a question which of these terms was intended to be the one alluded to by Jeremiah. In the table there are exactly twenty years between the seventieth year of the captivity of the third year of Jehoiakim and the one which began in the twenty-third year of Nebuchadnezzar. We learn from Jeremiah that Babylon was to be destroyed after the accomplishment of the seventy years' service of Judah.* If the destruction of Babylon is placed in B.C. 472, in which year fell the thirty-second year of Darius Hystaspes and the sixty-second year of his age, this will be the twenty-first year after the expiration of the seventy years' captivity reckoned from the twenty-third year of Nebuchadnezzar, B.C. 564. This calculation for the age of Darius only differs from that heretofore

* Jeremiah xxv. 12.

given, derived from the canon, in that it follows the canon as amended in this work. The time at which "Daniel understood by books the number of the years, whereof the word of the Lord came to Jeremiah the prophet, that he would accomplish seventy years in the desolations of Jerusalem" * is placed in the first year of Darius, the son of Ahasuerus. This is intended for Darius, the son of Hystaspes. This was probably in B.C. 495 or 494, in the ninth or tenth years of Darius, or the first year of the cycle, which began in B.C. 494, of which he was the eponym. It is possible the first year of Darius in Babylon is what is meant. Darius, in the inscription of Behistun, places Araeus, who had caused a revolt at Babylon, claiming to be Nabochodrossar, the son of Nabonidus, as the ninth king taken in battle. Usually one year may be allowed for each campaign, and if they are continuous, as they appear to have been in this case, each king taken in battle may denote a year of his reign. This also brings the capture of Babylon about to the ninth year of Darius. But this need not be insisted upon. The first year of Darius may be that of his accession in B.C. 503; but the year B.C. 495 suits exactly the circumstances related, for in B.C. 494, the following year, terminates the seventy years' captivity, reckoned from the twenty-third year of Nebuchadnezzar. We may suppose that Daniel understood the words of Jeremiah were fulfilled by the capture of Babylon. The circumstances were such as to lead to that impression, enforced as they were by his strong desire for the reproach of his people to be removed. A period of twenty-one years appears to have been understood and recognized, for we find it made the occasion of further delays upon the part of the Persians. Daniel at this time utters his prophecy of the coming of Messiah. "Seventy weeks are determined upon thy people and upon thy holy city, to finish the transgression, and to make an end of sins," . . . "and to anoint the Most Holy. Know therefore and understand, that from the going forth of the commandment to restore and to build Jerusalem, unto the Messiah the Prince, shall be seven weeks, and threescore and two weeks: the street shall be built again, and the wall, even in troublous

* Daniel ix. 2.

times." * The seventy weeks denote four hundred and ninety years, and these are subdivided into three periods: seven weeks, sixty-two weeks, and one week, the last implied. In the next chapter it is learned that the prince of the kingdom of Persia had withstood twenty-one days the answer to Daniel's prayer.† These are to be taken as years, just as the seventy weeks stand for four hundred and ninety years. Twenty-one years added to forty-nine years, the seven weeks of the first subdivision, give seventy years for the time which was to elapse during which the city was to be built in troublous times. This is the case as laid down in the chronology. From the termination of the captivity of the twenty-third year of Nebuchadnezzar, B.C. 494, unto the first year of Darius Nothus, B.C. 424, are exactly seventy years.

The scheme of the chronology connected with the sabbatical years is based upon the period of nine hundred years. By reference to the chronological table a period of nine hundred years, reckoned from the exodus, B.C. 1397, terminated in B.C. 498, and in this year also came to an end the seventy years of the captivity, reckoned from the eighteenth year of Nebuchadnezzar. It has been shown in treating of Hezekiah's reign that he observed the sabbatical years during his reign. King Josiah also instituted a reform in his reign, and followed the example of Hezekiah. The series of sabbatical years, reckoned from B.C. 1396–1395, which is followed, causes these years to fall as follows:

B.C.	610–9	sabbatical	year	1– 2	years of	Josiah.
"	604–3	"	"	8– 9	"	"
"	598–7	"	"	16–17	"	"
"	592–1	"	"	23–24	"	"
"	586–5	"	"	30–31	"	"

The sabbatical year of the 8–9 years of Josiah may be noticed. We are told in II. Chronicles xxxiv. 3, "For in the eighth year of his reign, while he was yet young, he began to seek after the God of David his father." The sabbatical year of Josiah's 30–31 years furnishes a comment upon the policy of Necho in making his expedition against Charchemish in that year, he believing he could not be interfered with, knowing the

* Daniel ix. 24, 25. † Ibid., x. 13.

character of this year and the prohibition against offensive warfare it laid upon the Jews. The disaster which befell Josiah, with this view, will be in consequence of his violation of the law of this year. Four sabbatical years fell in the reign of Hezekiah and four in the reign of Josiah, making eight in these two reigns. These, with, perhaps, two others observed in the early part of their history, will make ten sabbatical years observed by the Jews previous to the Babylonian captivity. In nine hundred years there should be one hundred and fifty sabbatical years, and deducting from these the ten, which are supposed, leaves one hundred and forty sabbatical years. This is the term of one hundred and forty years reckoned from the beginning of the captivity of the twenty-third year of Nebuchadnezzar down to the second year of Darius Nothus, which was covered by the seventy years of that captivity, the twenty-one supplemental years, and the seven weeks of years of Daniel.

In Ezekiel iv. 5 occurs, the days of the iniquity of Israel are three hundred and ninety, and in verse 6, the days of the iniquity of Judah are forty. There may be two ways of understanding these statements. The numbers either refer to periods of years or some form of iniquity connected with them. The periods to which they may refer are either three hundred and ninety and forty years of twelve months or the same in years of ten months. In the latter sense the three hundred and ninety years equal three hundred and twenty-five years of twelve months. The forty years equal thirty-three and one-third years of twelve months. The three hundred and ninety years of twelve months, counted from the first year of Jeroboam I., end with the captivity of the eighteenth year of Nebuchadnezzar, B.C. 498. The three hundred and ninety years of ten months, or the three hundred and twenty-five years of twelve months which represent them, end in B.C. 563, where falls the twenty-third year of Nebuchadnezzar and the year in which the last company of the Jews was carried into captivity. The other view of these numbers is that they point to an evil existing both in Judah and the kingdom of Israel. It is that in Judah they used a cycle of forty decimestrial years instead of the jubilee cycle of forty-two years. By the use of the cycle of forty years they neglected the sabbatical and jubilee years. It is said in verse 21 of the

last chapter of II. Chronicles, that the Jews were carried captive "To fulfil the word of the Lord by the mouth of Jeremiah, until the land had enjoyed her sabbaths: for as long as she lay desolate she kept sabbath, to fulfil threescore and ten years." The number three hundred and ninety may denote thirteen cycles each of thirty years of ten months, each equal to twenty-five years of twelve months. This is the Apis cycle which may be supposed to be the one introduced by Jeroboam I. with the Apis worship. It came to an end with the captivity of the twenty-third year of Nebuchadnezzar, when the land had rest. There remained after the three hundred and twenty-five years of twelve months accomplished in B.C. 563, sixty-five years, in which the land was to have rest, to complete the three hundred and ninety years of twelve months, there being sixty-five sabbatical years in that many years.

The reader must not confuse the four hundred and ninety years of Daniel's prophecy with the years of the jubilee cycle. This mistake may be made because this number equals ten jubilee cycles of forty-nine years each, which contain four hundred and ninety mixed years or four hundred and twenty tropical years. The basal number of Daniel's prophecy is seventy. This number occurs in various ways in technical chronology. It is found in the Egyptian myth of the five intercalary days. It is said Mercury played at dice with the moon and won from her the seventieth part of her light, out of which the five epagomenæ were made. In explaining this myth, it is said Ideler supposes the myth contemplated a lunar year of three hundred and fifty days, one-seventieth of which is five days, and that Scaliger supposes the myth wrongly reported, because five days is not one-seventieth of the moon's light. These writers overlook the general rule for assigning the numbers of days to cycles, years, and months, that in no case is the portion of a day allowed; all periods are reckoned in full days, and when necessary a day or days are afterwards added or subtracted. One-seventieth of the moon's light is five days and a small part of a day over. The myth means only that portion of the moon's light which, according to the rule, could be used to lengthen the year of three hundred and sixty days. Seventy years as the term of the life of man is mentioned in the Book of Psalms and

by Herodotus in his History. Herodotus endeavors to describe the cycle connected with this year, and appears to confuse the year of three hundred and sixty days and an intercalary month every six years, with a cyclic period of seventy years with an intercalary month of thirty-four days every other period, or after one hundred and forty years, and the omission of one day in seven hundred and seventy years. Seventy years is a subdivision of the cycle of seven hundred and seventy years, in which time the tropical year advances one hundred and eighty-six days, twelve hours *plus*, in the vague year, which is the time between the vernal and autumnal equinoxes. If a cycle is commenced with the autumnal equinox on the first day of a vague year, then after seven hundred and seventy years the vernal equinox will be on the first day of the vague year, and if the year is to be made tropical it may be done by passing over the interval between the two equinoxes as intercalary, and recommencing the year at the autumnal equinox.

Jewish chronology has so far been treated upon the basis of a vague year. The Jewish vague year was made to begin at the vernal equinox in B.C. 1397. At that time a concurrence between the Julian, the Egyptian, and the Jewish year was established to be April 2, Pachons 2, and Abib 1. Applying the doctrine of the cycle of seven hundred and seventy years to the Jewish year, we obtain the year B.C. 627 (1397–770) for the renewal of the date 1st of Abib at the vernal equinox. With the 1st of Abib at the vernal equinox, the concurrence in B.C. 627 will be March 27, Athyr 3, and Abib 1. The new table for the corresponding dates between the Jewish and Egyptian years will be:

Jewish Year.				Egyptian Year.
1st of the	first	month	concurs with	Athyr 3.
"	second	"	"	Khoiakh 3.
"	third	"	"	Tybi 3.
"	fourth	"	"	Mechir 3.
"	fifth	"	"	Phamenoth 3.
"	sixth	"	"	Pharmuthi 3.
"	seventh	"	"	Pachons 8.
"	eighth	"	"	Payni 8.
"	ninth	"	"	Epiphi 8.
"	tenth	"	"	Mesori 8.
"	eleventh	"	"	Thoth 3.
"	twelfth	"	"	Phaophi 3.

In II. Kings xxv. 8 the date of the destruction of the temple in the nineteenth year of Nebuchadnezzar by Nebuzar-adan, captain of the guard, is placed on the 7th of the fifth month. The 7th of the fifth month by the new table corresponds to the 9th of Phamenoth, and the 9th of Phamenoth in B.C. 567, in which year falls the nineteenth year of Nebuchadnezzar according to the chronology I have followed, concurs with the 16th of July. This is another instance of this famous date. Further, by the lunar year with the full moon of the first month following the vernal equinox, this will also be the date of the 7th of the fifth month. The lunar dates of the 1st of the first five months of the lunar year in B.C. 567 will be as follows:

1st of	first	month	concurs	with	13th of March.
"	second	"	"	"	11th of April.
"	third	"	"	"	11th of May.
"	fourth	"	"	"	9th of June.
"	fifth	"	"	"	9th of July.

These are dates of the visible new moon. Corresponding days for the first seven days of the fifth month for a Jewish vague year (era of B.C. 627), and the luni-solar year of B.C. 567 (reckoned from vernal equinox), and the Julian and Egyptian years are:

		Jewish Vague Year.		Jewish Lunar Year.
July	9 = Phamenoth 2 =			1st of fifth month.
"	10 = "	3 = 1st of fifth month	= 1st–2d	" "
"	11 = "	4 = 2d " "	= 2d–3d	" "
"	12 = "	5 = 3d " "	= 3d–4th	" "
"	13 = "	6 = 4th " "	= 4th–5th	" "
"	14 = "	7 = 5th " "	= 5th–6th	" "
"	15 = "	8 = 6th " "	= 6th–7th	" "
"	16 = "	9 = 7th " "	= 7th–8th	" "

In B.C. 567, July 16 fell on Thursday.

The concurrence of the 7th of the fifth month by the vague year of the era B.C. 1397 will be one hundred and eighty-six days earlier, January 11 and Thoth 3. A luni-solar year reckoned from the preceding autumnal equinox will be as follows:

B.C. 568.—Full moon on the day of the autumnal equinox,

September 30. The lunar year began with the new moon of September, visible on the 17th day of the month.

1st of	first	month,	B.C. 568,	concurs	with	September 17,	visible	new moon.
"	second	"	"	"	"	October 16,	"	"
"	third	"	"	"	"	November 15,	"	"
"	fourth	"	"	"	"	December 14,	"	"
"	fifth	"	B.C. 567,	"	"	January 13,	"	"

Corresponding dates for the Julian, Egyptian, Jewish vague (era B.C. 1397), Jewish luni-solar (reckoned from autumnal equinox), for the 7th of fifth month are:

Julian.		Egyptian.		Jewish Vague Year.			Jewish Lunar Year.		
January	5 =	Intercalary	2 =	1st of fifth month.					
"	6 =	"	3 =	2d	"	"			
"	7 =	"	4 =	3d	"	"			
"	8 =	"	5 =	4th	"	"			
"	9 =	Thoth	1 =	5th	"	"			
"	10 =	"	2 =	6th	"	"			
"	11 =	"	3 =	7th	"	"			
"	12 =	"	4 =	8th	"	"			
"	13 =	"	5 =	9th	"	"	=	1st of fifth month.	
"	14 =	"	6 =	10th	"	"	=	1st–2d	" "
"	15 =	"	7 =	11th	"	"	=	2d–3d	" "
"	16 =	"	8 =	12th	"	"	=	3d–4th	" "
"	17 =	"	9 =	13th	"	"	=	4th–5th	" "
"	18 =	"	10 =	14th	"	"	=	5th–6th	" "
"	19 =	"	11 =	15th	"	"	=	6th–7th	" "
"	20 =	"	12 =	16th	"	"	=	7th–8th	" "

In B.C. 567, January 20 fell on Friday. I have shown in a former chapter that the temple of Solomon was founded upon the 22d of January, B.C. 918, and now that its destruction was on the 20th of January, B.C. 567. According to this the temple stood three hundred and fifty-one tropical years. Both of these dates are twenty-two days after the winter solstice.

The date of B.C. 918 was the 20th of the second month of the Jewish vague year, and that of B.C. 567, the 7th of the fifth month, is of the Jewish luni-solar year, reckoned from the autumnal equinox.

CHAPTER XVIII.

THE GENERATIONS OF JESUS CHRIST.

St. Matthew opens his Gospel with the sentenee: "The book of the generation of Jesus Christ, the son of David, the son of Abraham." He gives two sehemes: in one are forty names in sueeession from Abraham to Christ, eaeh for a generation; in the other, he states, there are fourteen generations from Abraham to David; "from David until the earrying away into Babylon are fourteen generations; and from the earrying away into Babylon unto Christ are fourteen generations." In the list of names before mentioned David's is the fourteenth, and the twenty-eighth name is Jeehonias, begotten by Josias "about the time they were earried away to Babylon," showing that the list, although containing only forty names, is similar for the first two periods with the seheme of fourteen generations for each. I have disregarded the Jewish custom, whieh would make Phares the grandson of Judah, and the two to stand for three generations. The list of Matthew is a seleeted list; the eorresponding list in Luke iii. gives fifty-five names from Abraham to Christ, and forty-two names from David to Christ. The two numbers, forty and forty-two, so eharacteristie of the Old and New Testament, naturally suggest themselves as bases in ease of selected lists of names. It is evident forty generations eannot be divided into three periods eaeh of fourteen generations, but it ean be into three periods, one of twelve and the other two of fourteen generations. If the periods for both sehemes are substantially the same, twelve generations of one will eorrespond with fourteen generations of the other, and eaeh must use for generations different terms of years. Further, the three periods are of different lengths,—this we know from the ehronologies of both profane and saered history,—and to give them a real basis of fact they must be explained to be composed of generations of different lengths. First, as to the periods, these are not taken arbitrarily, but because some notable event falls at their begin-

nings, and this is one usually found in chronological systems as an epoch to and from which years are reckoned. The first period ends with David; this is to all intents the same as the epoch of the foundation of the temple of Solomon. The second period ends with Jechonias, and this is practically the same as the epoch of the destruction of the temple, in the nineteenth year of Nebuchadnezzar, and there was a carrying away into Babylon in the eighteenth year of this king. St. Paul, in Acts xiii. 18–22, appears to make the event of the foundation of the temple of Solomon the basis of his calculation of the time of the judges. He gives forty years for the wilderness; for the judges about the space of four hundred and fifty years; Saul, forty years, who was followed by King David. The term of four hundred and fifty years has been a puzzle to chronologers, because if the detail of numbers, as given in the Book of Judges, is examined, it is wide of the mark. I have shown that the four hundred and eighty years of I. Kings vi. 1 is a term of years of twelve months, reaching from the coming out of Egypt, and covering the year of the foundation of the temple of Solomon. St. Paul appears to have been acquainted with this number, or rather its equivalent expressed in years of ten months. Four hundred and seventy-nine years of twelve months equal five hundred and seventy-four years and eight months in decimestrial years; and the period, when extended to a date in the second month of the four hundred and eightieth year, is only a few days short of five hundred and seventy-five years. From this amount are to be subtracted one hundred and twenty-three years *plus*, which represent the items of the wanderings in the wilderness, the reigns of Saul and David, and three years *plus* of Solomon, and the remainder of four hundred and fifty-two years *minus* comes within the force of the words of St. Paul.

Second, the word generation as used in chronological systems does not always signify the same term of years. In its origin the word, in the first instance, was applied to the length of human life, and the average age of a parent at the birth of his first child. These terms in a second stage were adapted to astronomical periods, or their subdivisions. Various refinements on this system were in vogue. The Roman sæculum was of the length of one hundred and ten years. This was derived from

the natural sæculum, which is described to be the length of life of the person who lived longest of all those who were born on the date of the foundation of a town. Other terms are given for the sæculum, one of which is one hundred years. According to Niebuhr, one hundred years was the heroic age. In the Psalms of David and in Herodotus threescore years and ten are spoken of as the length of human life. In the Bible both Joseph and Joshua are said to have lived one hundred and ten years. Moses lived one hundred and twenty years, and if these were years of ten months, he died aged one hundred years of twelve months. One hundred years contain four cycles or generations of twenty-five years, and in connection with dates of the vague year these are lunar periods. Cycles are also used for generations. The cycle of eighty-four years employed by the Jews after the return from the Babylonian captivity may be cited. It is particularly of interest because it also is subdivided into four minor cycles, each of twenty-one years, which number of years is so common as the legal age. Eighty-four years contain twelve periods of seven years, a number also of common use in connection with *age*. Seventy years is an astronomical period, being a mean of the precession of the equinoxes of one degree in seventy years. Forty years is also used for the term of a generation, and, according to Herodotus, the Egyptians made use of thirty-three and one-third years for a generation, three of which made up a century. Of these generations the following are indicated in the Bible: generations of one hundred, one hundred and ten, seventy, eighty-four, and forty years. A generation of forty years of twelve months is found; there are twelve such between the exodus and the foundation of Solomon's temple; also, a generation of forty decimestrial years which equalled the Herodotan generation of thirty-three and one-third years. Further, we may include in the generation of one hundred years its four subdivisions of twenty-five years each.

If the length of each of the three periods can be established from statements and details of years found in the Bible and from other sources which are not contradictory, and if the total of years for each of these periods may be divided into fourteen generations, using any one of the kinds just described; or if the division of one period into twelve generations and the other

two into fourteen generations, each in a similar manner, is possible, the conclusion is reached that the chronology which permits this is in accordance with the system indicated by Matthew, provided, however, it is fairly done, and no perversion of any biblical statement is attempted.

THE FIRST PERIOD FROM ABRAHAM TO THE FOUNDATION OF THE TEMPLE OF SOLOMON.

In Genesis xvii. 1–14 it is said God made a covenant with Abram when he was ninety and nine years old. Its purport was that Abraham was to be the father of many nations, and the blessings of the covenant were to be extended to Abraham's seed after him. "I will establish my covenant between me and thee and thy seed after thee in their generations, for an everlasting covenant, to be a God unto thee and to thy seed after thee." God further covenants to give to Abraham and his seed after him the land wherein he is a stranger, all the land of Canaan, for an everlasting possession. In a previous chapter (xv. 18–21) this covenant is also spoken of, and the verses which immediately precede it contain the prophecy that the seed of Abraham "shall be a stranger in a land that is not theirs, and shall serve them; and they shall afflict them four hundred years. . . . But in the fourth generation they shall come hither again." This, interpreted by the light of subsequent events, refers principally to the sojourn of the children of Israel in Egypt. In Exodus xii. 40, 41 it is said: "Now the sojourning of the children of Israel, who dwelt in Egypt, was four hundred and thirty years. And it came to pass at the end of the four hundred and thirty years, even the selfsame day it came to pass, that all the hosts of the Lord went out from the land of Egypt." Although this rendering of the text does not expressly state that the children of Israel dwelt in Egypt four hundred and thirty years, it has been supposed to have that meaning. The affliction for four hundred years, the return in the fourth generation, and the sojourn in Egypt of four hundred and thirty years have been supposed to be conflicting. But there is a scheme by which they may be harmonized. The affliction was not coterminous with their sojourn in Egypt. We are expressly told of the kind treatment Jacob and his family

received when they entered Egypt; but how long did this last? We may assume that while Joseph was alive his influence was powerful enough to protect his brethren. Joseph was thirty years old when he stood before Pharaoh at the beginning of the seven years of plenty, and when he reveals himself to his brethren he tells them that the famine had been two years in the land. From this it appears he was forty years old when Jacob, his father, entered Egypt. If the sojourn of the children of Israel is calculated from the entrance of Jacob, and as Joseph died one hundred and ten years old, his death was seventy years after the beginning of the sojourn in Egypt. If the fourth generation and the four hundred years are synonymous, they all are harmonized in the following way:

From entrance of Jacob to death of Joseph	70 years.
From death of Joseph to exodus	360 "
Sojourn in Egypt	430 "

The affliction began seventy years after the entrance of Jacob, and ended when the Jordan was crossed and they returned to Canaan.

From death of Joseph to exodus	360 years.
From exodus to crossing of Jordan	40 "
	400 "

They were to return to Canaan in the fourth generation. Jacob was one hundred and thirty years old when he entered Egypt, and the death of Joseph was seventy years afterwards, or two hundred years from the birth of Jacob. This represents two generations, each of one hundred years, one for Jacob and one for Joseph, or Jacob's immediate descendants. The first generation of one hundred years in Egypt began at the death of Joseph, when we now suppose began the afflictions of the children of Israel; it was the seventy-first year after the entrance of Jacob; the second century began the one hundred and seventy-first year afterwards, the third century began with the two hundred and seventy-first year, and the fourth century began with the three hundred and seventy-first year after the descent of Jacob; and as the crossing of the Jordan was four hundred and

seventy years after the descent of Jacob, it just falls within the fourth century, if the reckoning of years in the case of the fifth generation was from the autumnal equinox, or some date following the crossing of the Jordan. In this way the three statements we have been considering may be carried out.

I. Scheme of Twelve Generations from Abraham to the Foundation of the Temple of Solomon.

Abraham to Isaac (Genesis xxi. 5)	100 years.	
Isaac to Jacob (Genesis xxv. 26)	60 "	
Age of Jacob, entering Egypt (Genesis xlvii. 9) . . .	130 "	
Sojourn in Egypt (Exodus xii. 40)	430 "	
		720 years.
Exodus to foundation of temple (I. Kings vi. 1) . . .		480 "
		1200 "

According to this scheme there are twelve hundred years from Abraham to the temple, or twelve generations of one hundred years each.

II. Scheme of Fourteen Generations.

In Genesis xxxvii. is related the events connected with the bondage of Joseph. The account commences with the statement that Joseph was seventeen years old. If Joseph went into Egypt when he was seventeen years old, and if from this point is calculated the sojourn of the seed of Abraham in Egypt, the time from Abraham to the exodus will be shortened twenty-three years, the difference between the ages seventeen and forty years of Joseph. The items will then be:

Abraham to Isaac	100 years.
Isaac to Jacob	60 "
Jacob to captivity of Joseph	107 "
Sojourn in Egypt	430 "
Exodus to temple	479 "
	1176 "

This equals exactly fourteen generations of eighty-four years. Eighty-four years was a cycle used by the Jews after the return from the captivity to Babylon.

The difference of one year between the two items, four hun-

dred and eighty and four hundred and seventy-nine, for the time between the exodus and the temple arises from the fact that in one case the term is calculated from the era of the tabernacle, which was the second year of the exodus, so that the four hundred and seventy-ninth year from that will be the four hundred and eightieth year of the exodus. In the other case the calculation is from the exodus, and there are four hundred and seventy-nine years *plus* down to the foundation of the temple in the four hundred and eightieth year.

Neither of the schemes just described is the favored one by chronologers. They incline to that which reckons the four hundred and thirty years of Exodus xii. 40, from the call of Abraham to the exodus. The calculation is begun from the time Abraham was seventy-five years old. It is as follows:

From call of Abraham to birth of Isaac	25 years.
From Isaac to birth of Jacob	60 "
Age of Jacob, entering Egypt	130 "
Israelites in Egypt	215 "
Total	430 "

This scheme has for its foundation a different reading of the passage in Exodus xii. 40, 41, found in the Alexandrian MS. of the LXX. "The sojourning of the children of Israel, and their fathers, which they sojourned in the land of Canaan, and in the land of Egypt, was four hundred and thirty years." Also, an inference from the genealogy of Moses and Aaron, found in Exodus vi. 18–20 and Numbers xxvi. 59. The genealogy of the descendants of Judah also shows that Hezron, the son of Pharez, and Ram, the son of the former, and Amminadab, the son of Ram, are the three generations which were born in Egypt, because Nahshon, the son of Amminadab, was the prince of Judah at the time of the exodus. These have led to a confirmatory interpretation of a passage in the writings of St. Paul (Galatians iii. 15–17). But the passage is sufficiently vague for it to apply to this and the opposing scheme already discussed. The Epistle to the Galatians was written by St. Paul to resist a Judaizing tendency among the believers. Certain among them were teaching that the observance of the ceremonial requirements of the law of Moses was essential to salvation. St. Paul

tells them: "But that no man is justified by the law in the sight of God, it is evident: for, The just shall live by faith." He tells them, Abraham was justified by faith, and alludes to the promise made to Abraham in the following language: "Brethren, I speak after the manner of men; Though it be but a man's covenant, yet if it be confirmed, no man disannulleth, or addeth thereto. Now to Abraham and his seed were the promises made. He saith not, And to seeds, as of many; but as of one, And to thy seed, which is Christ. And this I say, that the covenant, that was confirmed before of God in Christ, the law, which was four hundred and thirty years after, cannot disannul, that it should make the promise of none effect." Some have claimed that the last clause virtually asserts that between the covenant with Abraham and the exodus there elapsed only four hundred and thirty years; but in opposition to this St. Paul's argument may be put in this way: the children of Israel were saved and brought out of Egypt by the covenant which was confirmed by God, and not by obedience to the law of Moses, which was not promulgated until four hundred and thirty years after the beginning of their sojourn in Egypt. All this time they were without the law of Moses, yet they were preserved, so the same covenant, which was confirmed in Christ, cannot be disannulled by the law.

Without any pretence being made to decide between these schemes, I wish to show how the statement in the Septuagint conforms to that of Matthew. To do this I make the sojourn in Egypt to last two hundred and ten years, instead of two hundred and fifteen. This is done because seventy years is the generation adapted to this scheme, and the genealogies of Judah and Levi show that three generations were born and had died in Egypt, and three generations of seventy years equal two hundred and ten years. It begins seventy years after the birth of Abraham. We are told, in Genesis xi. 31, that Terah took Abram, his son, and Lot, his grandson, and went forth from Ur of the Chaldees, to go to the land of Canaan, and they came to Haran and dwelt there. In Genesis xii. 1 we learn that Abram was commanded by God, "Get thee out of thy country, and from thy kindred, and from thy father's house, unto a land that I will shew thee." At this time Abram was in Haran, and in

xii. 4 we are told he was seventy-five years old. Allowing five years for residence in Haran, Abraham was seventy years old when he departed from Ur of the Chaldees, or his native country. Abraham, when he departed from Ur, *began to dwell in a land which was not his;* the prophecy is retrospective. The basis of this scheme is substantially the same as the one just described, only in the first case the calculation is from the departure from Haran, and in the last it is counted from the going away from Ur of the Chaldees.

III. Scheme of Seventy Years to a Generation.

Age of Abraham, departing from Ur			70 years.
To the birth of Isaac	430 years	400 years .	30 "
To the birth of Jacob			60 "
To descent into Egypt			130 "
Sojourn in Egypt			210 "
			500 "
Exodus to temple			480 "
			980 "

Nine hundred and eighty years are equal to fourteen generations of seventy years each. The four hundred and thirty years of the sojourn in a strange land begin with the departure of Abraham from Ur, and the four hundred years during which the seed of Abraham were to be afflicted begin with the birth of Isaac, the first representative of his seed, and end at the exodus from Egypt.

SECOND PERIOD OF FOURTEEN GENERATIONS.

If the period between David and the carrying away to Babylon be divided into fourteen generations, a different term of years must be employed for a generation.

The detail of the years of the reigns of the kings of Judah, from Rehoboam to Zedekiah, inclusive of both, makes a total of three hundred and ninety-three years and six months; and if to these are added eighty years for Solomon's and David's reigns, the period is only four hundred and seventy-three years *plus.* No allowance is made for overlapping years of reigns, yet the period is numerically less than the time from the exodus to the foundation of the temple, eighty-three years after the accession

of David. But if the period is counted from the foundation of the temple, in the beginning of the fourth year of Solomon, we have for the reign of Solomon, after that event, thirty-seven years, *plus* the time from Rehoboam to a date in the first year of Zedekiah, three hundred and eighty-three years, which make a total of four hundred and twenty years, or fourteen generations of thirty years each. This, upon examination, is not without objections, because no allowance is made for overlapping of reigns. Still, the calculation of four hundred and twenty years ends with a carrying into Babylon in the seventh year of Nebuchadnezzar (Jeremiah lii. 28), which may have concurred in part with the first year of Zedekiah.

The chronology, as followed in this book, treats these years as decimestrial years. Overlappings of reigns are allowed, the joint reign of Jehoram and Jehoshaphat for four years is taken into account, synchronisms between the lines of Judah and Israel are adhered to, and a system is followed which closes all gaps in the two lines not otherwise accounted for, with the result that, between the foundation of the temple in B.C. 918 to the captivity of the eighteenth year of Nebuchadnezzar (Jeremiah lii. 29) in B.C. 568, there are three hundred and fifty years, or fourteen generations of twenty-five years each, which are equal to four hundred and twenty decimestrial years, or fourteen generations each of thirty decimestrial years. It may also be noticed that the difference between four hundred and twenty years of twelve months and the same number of years of ten months is seventy years of twelve months, which was the term of the Babylonian captivity.

THIRD PERIOD OF FOURTEEN GENERATIONS.

This period is not of the length of either of the two preceding. In the usual chronology the fourth year of Jehoiakim, from which is reckoned the first Babylonian captivity, has about the epoch of B.C. 605. The captivity of the seventh year of Nebuchadnezzar is about B.C. 598, and that of his eighteenth year is B.C. 585. The era of the birth of Christ is in dispute. Chronologers have placed it in all the years from B.C. 7 to A.D. 3, inclusive, of the vulgar era. We have, following any of the above epochs, B.C. 605, B.C. 598, B.C. 585, for the beginning of the

third period, a term of years to the birth of Christ which is reduced or lengthened by assuming the latter event to have been anywhere between seven years before and three years after the vulgar era. Since fourteen generations of forty-two years each equal five hundred and eighty-eight years, the epoch B.C. 585, for the eighteenth year of Nebuchadnezzar, is the only one that comes at all near the amount of any of the possible generations used to make up the fourteen. It may be said for the generation of forty-two years that it is thoroughly a Jewish number. I have endeavored to show in previous chapters that this was the length of the Jewish jubilee cycle. It also occurs as the total of the generations from Abraham to Christ (14×3). The chronology of this book places the captivity of the eighteenth of Nebuchadnezzar in B.C. 568. Since fourteen generations, each of forty years, equal five hundred and sixty years, this chronology also conforms to the required number of generations, allowing for an error in the vulgar era of the birth of Christ. Forty is a well-known number applied to a generation, and it is also found associated with the periods of fourteen generations, because Matthew, in his list, only gives the names for forty generations. We may notice here one of those confusing interchanges between years of twelve and ten months. Fourteen generations of forty-two years equal five hundred and eighty-eight. Taking this number without any reference to the term of forty-two years, which implies a year of twelve months, and regarding them as years of ten months, they equal four hundred and ninety years of twelve months, which is the period predicted by Daniel for the coming of the Messiah. The twenty-one years of Daniel in connection with the captivity of the twenty-third year of Nebuchadnezzar, following the chronology of this book, came to an end in B.C. 493, and the seven generations of seventy years (four hundred and ninety years) end at B.C. 3, the most approved epoch of the birth of Christ.

CHAPTER XIX.

MANETHO AND THE EXODUS OF THE CHILDREN OF ISRAEL FROM EGYPT.

JOSEPHUS'S history, "The Antiquities of the Jews," compiled principally from the Hebrew Scriptures, was attacked by certain Egypto-Greek writers, who charged him with giving his nation too great antiquity; they claimed that the Jews were of a late date. To defend his history and controvert these charges he wrote the books which are known as "Against Apion," one of these critics. In refutation, Josephus brings the testimony of the Egyptians themselves, as contained in the history compiled by Manetho for the king, Ptolemy Philadelphus. While using Manetho in this way, he does not hesitate to charge him with giving two different accounts of the same event, the departure of the children of Israel from Egypt. The two stories are given in the above-mentioned dissertation against Apion.* The first story is as follows:

"There was a king of ours whose name was Timaus. Under him it came to pass, I know not how, that God was averse to us, and there came, after a surprising manner, men of ignoble birth out of the eastern parts, and had boldness enough to make an expedition into our country, and with ease subdued it by force, yet without our hazarding a battle with them. So when they had gotten those that governed us under their power they afterwards burnt down our cities, and demolished the temples of the gods, and used all the inhabitants after a most barbarous manner: nay, some they slew, and led their children and their wives into slavery. At length they made one of themselves king, whose name was Salatis; he also lived at Memphis, and made both the upper and lower regions pay tribute, and left garrisons in places that were the most proper for them."

We are further told that this Salatis, in order to protect his

* "Against Apion" (Josephus), 14, 15, 26, 27, 28.

power from incursions from the east, rebuilt the city of Avaris, which lay on the Bubastic channel of the Nile, and placed in it a garrison of two hundred and forty thousand armed men. "'This whole nation was styled Hycsos, that is, Shepherd Kings, for the first syllable Hyc, according to the sacred dialect, denotes a king, as is Sos a shepherd, but this according to the ordinary dialect; and of these is compounded Hycsos: but some say that these people were Arabians.' Now, in another copy it is said that this word does not denote kings, but, on the contrary, denotes captive shepherds, and this on account of the particle Hyc; for that Hye, with the aspiration, in the Egyptian tongue again denotes shepherds, and that expressly also; and this to me seems the more probable opinion, and more agreeable to ancient history."

These and their descendants "'kept possession of Egypt five hundred and eleven years.'" After this the kings of Thebes and other parts of Egypt made an insurrection against them, and a long war ensued. "'Under a king whose name was Alisphragmuthosis the shepherds were subdued by him, and were indeed driven out of other parts of Egypt, but were shut up in a place that contained ten thousand acres: this place was named Avaris.' Thummosis, the son of Alisphragmuthosis, besieged them for a long time, and being unable to take the place by force, he agreed to allow them to leave Egypt with their families and effects. These then left Egypt and went into Syria, where they built a city and named it Jerusalem."

Josephus, after giving this account, goes on to say: "But now I shall produce the Egyptians as witnesses to the antiquity of our nation. I shall therefore here bring in Manetho again, and what he writes as to the order of the times in this case, and thus he speaks: 'When this people or shepherds were gone out of Egypt to Jerusalem, Tethmosis, the king of Egypt who drove them out, reigned afterward twenty-five years and four months,'" etc. This, and the following kings given in this connection by Josephus, belong to the eighteenth dynasty. Josephus understands Thummosis, the son of Alisphragmuthosis, to be the same as Tethmosis, and by Tethmosis he means one of the kings who bore the name of Thothmes or Thutmes, and who reigned in this dynasty. The first king of this dynasty was not Tethmo-

sis, but by the table of Abydos he was Aahmes, thereby confirming the copies of Africanus and Eusebius, who place as the first king Amos, or Amosis. But there is a seeming encouragement to the statement of Josephus, for Africanus says Moses went out of Egypt in the time of Amos.

The Second Story.—Josephus prefaces the second story by declaring it to be an invention of Manetho, who, after giving the first story, had done this "in order to appear to have written what rumors and reports passed abroad about the Jews, and introduces incredible narrations, as if he would have the Egyptian multitude, that had the leprosy and other distempers, to have been mixed with us, as he says they were, and that they were condemned to fly out of Egypt together, for he mentions Amenophis, a fictitious king's name, though on that account he durst not set the number of years of his reign, which yet he had accurately done as to the other kings mentioned; he then ascribes certain fabulous stories to this king, as having in a manner forgotten how he had already related that the departure of the shepherds for Jerusalem had been five hundred and eighteen years before; for Tethmosis was king when they went away."

The story, in substance, is as follows: A certain king, Amenophis, desired to behold the gods. He consulted one who had the same name, Amenophis, the son of Papis, who advised him to gain the favor of the gods by expelling from Egypt all leprous and unclean persons. But instead of this he sent them to the stone-quarries. Afterwards the king granted a request they made to permit them to occupy the city of Avaris, which had remained desolate since the departure of the shepherds. Among the ostracized ones were several learned priests afflicted with the same malady, and one of them, named Osarsiph, a priest of Heliopolis, they made their leader. Having fortified the city, Osarsiph excited an insurrection against Amenophis, and sent to Jerusalem to the formerly-expelled shepherds for aid. They responded with alacrity, and came to the assistance of Osarsiph, whose name was afterwards changed to Moses. Amenophis and his army were compelled to fly into Ethiopia, where they remained thirteen years. During these thirteen years the Egyptians were treated by their oppressors with

great barbarity, "for they did not only set the cities and villages on fire, but were not satisfied until they had been guilty of sacrilege, and destroyed the images of the gods, and used them in roasting those sacred animals that used to be worshipped, and forced the priests and prophets to be the executioners and murderers of those animals, and then ejected them naked out of the country."

After the expiration of thirteen years Amenophis returned to Egypt with a great army, and drove these leprous and unclean people and their allies out of Egypt to the bounds of Syria.

Comparing these two stories, there is nothing in the one contradictory of the other. It is only as we adopt the view of Josephus, that the facts related in the first story refer to the Jews, that such a charge can be made. The only truly Jewish allusion made in it is that to the city of Jerusalem, but this, when examined, fails; for the Bible in no place asserts that the Jews founded that city, but, on the contrary, that it was a city of the Jebusites, smitten and set on fire by Judah.*

The Sallier papyrus† is believed by scholars to describe certain events which preceded the era of the eighteenth dynasty. These are similar to some which form a part of the first story. The following from the papyrus-roll is to this point: "It came to pass that the land of Kemi belonged to enemies. And nobody was lord in the day when that happened. At that time there was, indeed, a king Ra-Sekenen, but he was only a Hak of the town of the south, but the enemies sat in the town of the Amu, and there was a king (Ur) (2) Apopi in the town of Auaris. And the whole world brought him its productions, also the northern land did the same with all the good things of Tameri; and the king Apopi (3) chose the god Set for his divine master, and he did not serve any of the gods which were worshipped in the whole land." "There had, evidently, before this begun a correspondence between the tyrant in the north and the Hak in the southern land, in which the first named, among other things, required of the last to give up the worship of his gods, and to worship Amon Ra alone as the only divinity of the

* Judges i. 8.

† "Egypt under the Pharaohs" (Brugsch), vol. i. p. 239. Eng. trans.

country. Ra-Sekenen had declared himself prepared for all, but had added a proviso to his letter, in which he expressly declared, to allow him to speak for himself, 'that he was not able to promise to serve no other of the gods which were worshipped in the whole country but Amon Ra, the king of the gods, alone.'"* This papyrus informs us of other matters which show a strained condition of things as existing between the two. Of what the outcome of all this was we are unfortunately left in ignorance by the writer abruptly changing the narration to an entirely different matter. But the monuments here render some assistance. There were several kings who bore the name of Ra-Sekenen. The successor of the last of these, named Kames, was the father of Aahmes, who became the first king of the eighteenth dynasty.† The internecine war raging in Egypt was terminated by the capture of Avaris and other cities by Aahmes, and the whole country was brought under his sole sovereign sway. Dr. Brugsch says, "A strange enigma covers this age of shame, the veil of which we are not yet able to lift.

"For had that hatred been so universal as Manetho's picture of the conflagrations, sacking of temples, and persecutions of the inhabitants by princes of the foreign hordes gives us to understand, how are we to explain the strange fact that these same Egyptians, not excepting the college of priests of the Theban Amon, in the time of the Hyksos and the following dynasties, could prevail upon themselves to give their children pure Semitic names, borrowed from the language of their hereditary enemies? How could they themselves offer their homage to those gods of the strangers who had done their land so much mischief, even to the extirpation of the native divinities?" ‡ This being the condition of things, and if these so-called foreigners had controlled Egypt five hundred and eleven years, as Manetho says, they could claim to be Egyptians. To charge them with being foreigners after so long a naturalization would be the same as if one of the descendants of the Saxons who fought with Harold at Hastings should, in the time of Eliza-

* "Egypt under the Pharaohs" (Brugsch), vol. i. p. 240. Eng. trans.
† Ibid., pp. 245, 246, 252, 253.
‡ Ibid, p. 254.

beth, call those descended from the Normans a foreign people, for no other reason than that they, the Saxons, had occupied Britain some five hundred or more years before the Normans, who, in the time of Elizabeth, had been masters of the land also for five hundred years. How can be explained Manetho's view? It seems to me the explanation lies in the peculiar circumstances which mark the history of this people. They, throughout their history, were subjected to many dynastic changes, and these arising, in part, from a continuous emigration from the east into Egypt. We meet this in the times previous to the eighteenth dynasty. Then the struggle was between independent kings for the supremacy. There is no evidence to show that the line of the eighteenth dynasty had any legitimate right to reign over Egypt, other than that its first king, Aahmes, had married a descendant of the old line of kings, and this, of course, was secondary to the right which his triumphant arms gave him to be the master. The eighteenth dynasty came to an end in a period of confusion of which there are extant no clear historic details. The Ramessids of the nineteenth dynasty are believed to have been of Semitic origin, but, by intermarriage with the old royal race, to have gained the color of legitimacy. Between the nineteenth and twentieth dynasties there is another struggle between rival kings. The twentieth dynasty came to an end with the insurrection of the priestly class at Thebes, who appear to have been of the same race or family as the kings of the eighteenth dynasty. These last, the twenty-first, were overthrown by the rival dynasty of Bubastus, by some claimed to be of Semitic origin; at all events, of a race differing from that of the priestly dynasty. We next find the descendants of the priestly class returning from retirement in Ethiopia, and recovering Egypt again. These, in their turn, are overthrown by the Assyrians, and the twenty-sixth dynasty uniting by intermarriage, the two contending factions for the throne continue in power until they are overthrown by the Persians and Egypt reduced to a province of that empire. Looking at the history with these facts prominent, nothing is more apparent than that during the last four hundred years a struggle had been going on between two factions for the supremacy, and without determining which of these more nearly represented the first, or even

the middle, Egyptian empire, it is clear that one of these, the Ethiopian, was the representative of a distinct and aggressive cult. If we compare the Sallier papyrus with the first story, it is discovered that a common spirit pervades both. Not only is the animus the same, but the side taken between the contending parties by the two narrators is the same. The Sallier papyrus was not written earlier than the reign of Rameses II., because it also narrates events of that king's reign, and we know not how much older than its author is the story ascribed to Manetho. The monuments do not agree with either, but convey a condition of things entirely opposed to both. Is the story of the Sallier papyrus to be removed far back to the beginning of the so-called shepherd rule, and given to the times of that Apophis, mentioned by Josephus as the fourth king of that dynasty of which Salatis was the head? If so, then the monuments show the inevitable change which a long occupation of a country will work both on the conquerors and on the conquered, in making them more like one another, and destroying grave differences in religion or civilization. Such an hypothesis further allows, in spite of all softening influence of time, the continuance in a portion of one of the contending parties of a vindictive and intractable enmity towards the memory of the so-called shepherd rulers.

Turning to later times than these, a remarkable writing of the time of Rameses III. commands attention. As understood by some, it describes the condition of things existing during the disturbances which preceded the twentieth dynasty. It is found in what is known as the Harris papyrus. A portion is translated as follows: "The people of Egypt lived in banishment abroad. Of those who lived in the interior of the land, none had any to care for him. So passed away long years, until other times came. The land of Egypt belonged to princes from foreign parts. They slew one another, whether noble or mean. Other times came on afterwards, during years of scarcity. Arisu, a Phœnician, had raised himself among them to be a prince, and he compelled all the people to pay him tribute. Whatever any had gathered together, that his (*i.e.*, the Phœnician's) companions robbed them of. Thus did they. The gods were treated like the men. They went without the

appointed sin-offerings in the temples. Then did the gods turn this state of things to prosperity. They restored to the land its even balance, such as its condition properly required."* Rameses III. continues with an account of the establishment upon the throne of his father, King Setnakht Merer Mianum. Dr. Brugsch regards this Arisu or Alius as the rival of Setnakht in the struggle for the throne. But is this necessarily the case? The writing begins apparently with an account of remote historical matter. The omission of the achievements of the great kings of the eighteenth and nineteenth dynasties may be due wholly to the spirit of self-glorification which the kings of Egypt indulged to so great an extent.

This writing contains statements similar to those of the first story of Manetho. This name Arisu is also written Alius. This forms the chief part of the name of the king who warred against the shepherds, Alisphragmuthosis. A name of similar construction to the last occurs in the eighteenth dynasty,—Mephramuthosis or Misphramuthosis. This name is rendered in the following forms by Sir I. Gardner Wilkinson: Mesphra-Thutmosis, or Misphra-Tummosis, or Thothmosis. In this we find a reference to the name Thummosis given to the son of Alisphragmuthosis by Josephus. There seems to be a confusion between it and the name Thothmes or Thutmes. Thummosis is not the same as Thutmes. In the same papyrus of Rameses III. the name of the god Tum occurs in such passages as, "He purified the exalted royal throne of Egypt, and so he was the ruler of the inhabitants on the throne of the sun-god Tum," and "thus was I clothed with the robes of state, like Tum." The name of this god is also written Atum, Tmu, Tethmu. In Greek inscriptions he is called Tomos. "Though principally worshipped in Lower Egypt, he holds a conspicuous place amongst the contemplar gods of Thebes."† His principal place of worship was at An, or Heliopolis. It was the practice among the ancients to combine in the names of individuals those of the gods. If the name of Tum or Tethmu be used in this way, we have Tummosis or Thummosis; Tethmuosis or Tethmosis.

* "Egypt under the Pharaohs" (Brugsch), vol. ii. p. 137. Eng. trans.
† "The Ancient Egyptians" (Wilkinson), vol. iii. p. 178.

If such is the derivation of the name of this king who drove out the shepherds, it was not the same as Aahmes or Thutmes. Thutmes means "Thut's child," but the other appears to have a similar reference to Tum. Since to the Egyptians the sun arose as Horus, and shone in mid-heaven as Ra, and set as Tum; and as we find Egyptian names compounded of Horus and Ra, we may expect a like use to be made of Tum. The suggestion I have made, that possibly the Alius of the Harris papyrus is the Alisphragmuthosis of the first story of Josephus, puts the Harris papyrus in contrast with the Sallier, and in addition the hypothesis implies that we have in the latter (Sallier) an account written by one who was in sympathy with the side of Alisphragmuthosis, and in the other the statement of him who inherited the interests and animosities of that king's adversaries.

Neither of these papyri contain reference to anything to be identified with the departure of the Jews, nor do those portions of the first story which may be compared with them. It is said in the Harris papyrus, "Other times came on afterwards, during years of scarcity. Arisu, a Phœnician, had raised himself among them to be a prince, and he compelled all the people to pay him tribute. Whatever any had gathered together, that his (*i.e.*, the Phœnician's) companions robbed them of." This resembles the story of the famine in Egypt, and the result of it, which brought into the treasure-house of Pharaoh all the money of Egypt and Canaan, and all the possessions of the Egyptians of horses, cattle, and lands. The lands were relet to the Egyptians, but they had to pay one-fifth part ever afterwards to Pharaoh. But this has no reference to the subject under discussion,—the circumstances attending the departure of the children of Israel from Egypt.

THE HYKSOS.

Josephus furnishes us with two different interpretations of the word Hyksos. One is that the term designated a race whose kings were called shepherd kings, the other is that the word meant captive shepherds.

The adoption of the title shepherd as a royal one is instanced

in the case of the early Chaldeans. Alôros, of Babylon, an antediluvian king, adopted this mode of designating his kingly office. "Alôros took the title of 'shepherd,' a title which we find assumed by the early Chaldean princes." *

The Hyksos are generally believed to have belonged to the nation of the Menti, or natives of Syria. Dr. Brugsch explains the term by which they were designated by Josephus in the following language: "If the kind reader will now recall to his thoughts what we have said about the Arab Bedouins, who inhabited the desert to the east of Egypt, and were called in Egyptian Shasu (also Shasa, Shaus, Shauas), he will certainly be of the same opinion as ourselves, that those who maintain the Arab origin of the Hyksos must have drawn their information from a pure Egyptian source, for that word Sos answers completely to the old Egyptian Shasu, in which the sound sh, which did not exist in Greek, according to usage, was replaced by a simple s. Although Manetho, when he talks of the Hyksos, insists upon the meaning of shepherd, he could only do this in consequence of a strange confusion, since he turns to the new and popular language of his own time to explain the second syllable sos, in which, accidentally, sos (or shos, as the same word is still pronounced in Coptic) means a shepherd." † In another place this writer says, "We will not, however, on the other hand, maintain that the appellation Hak Shaus is the same which the bearers of it, of whatever descent they might boast, either formed of their own accord for themselves or assumed on account of their office. It is far more probable that the Egyptians, when at last they drove away their tyrants of Semitic blood, gave these princes, who for several centuries had considered themselves as the legitimate kings of Egypt, the nickname of Hak Shasu by way of a contemptuous expression." ‡

The term Cush became in later times interchangeable with that of Ethiopia. It was of very extensive application, and was bestowed upon the homes of black-skinned peoples, whether

* "The Ancient Empires of the East" (Sayce), p. 106.

† "Egypt under the Pharaohs" (Brugsch), vol. i. pp. 229, 230. Eng. trans.

‡ Ibid., p. 232.

they were negroes or not. It belonged generally to the country between the Oxus and the Ganges, extending to the coast. It also included Arabia, Egypt, and Nubia. In still later times the name Ethiopia is more confined. African Ethiopia was to the south of Egypt proper; Asiatic Ethiopia "the tract intervening between Eastern Persia and the mouth of the Indus."* Among several of the more important nations or peoples occupying these sections of Asia and Africa there appears to have been a common love and reverence for the horse. It exists to a remarkable degree at this day among the descendants of those whom Dr. Brugsch identifies as the Shasu or Arab Bedouins In the reign of Thutmes I. the horse first appears on the monuments under his Semitic name *Sus*. "In the tomb of the noble Pahir, the son of the brave 'warrior' Aahmes, at El-Kab, there appears, among numerous representations of common life, a picture of a pair of horses with a chariot. The coachman, designated by the Semitic name Kasan, stands behind the chariot, holds tight the reins of the horses, in expectation of his lord, 'who loves the clever horses.'"† I propose to interpret the term Hyksos by this word *sus*.

The relationship of the kings of the eighteenth to the priestly dynasty is beyond dispute. These latter, after wresting the power from the Ramessids of the twentieth dynasty, were in their turn subjected to a like treatment at the hands of Sheshank, of the twenty-second dynasty. "It was during this period of internal dissension," according to Mr. Sayce,‡ "that the bodies of Thutmes III., of Rameses II., and of the other great princes of the eighteenth and nineteenth dynasties, were transferred from their tombs to the secret cavern near Deir-el-Bahâri, at Thebes, where they were interred along with the members of the family of Pinotem," one of this priestly class. Amenhotep III., of the eighteenth dynasty, had erected at Mount Barkel, in Ethiopia, a temple fortress, or fortified sanctuary, for the god Amon, of Thebes.§ Thither this priestly

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* "Herodotus" (Rawlinson), vol. i., Essay xi. and note, p. 529.

† "Egypt under the Pharaohs" (Brugsch), vol. i. p. 295. Eng. trans.

‡ "The Ancient Empires of the East" (Sayce), p. 50.

§ "Egypt under the Pharaohs" (Brugsch), vol. ii. p. 226. Eng. trans.

dynasty retired when Sheshank drove them from the throne, and there established the kingdom of Napata, and styled themselves kings of the land of Cush. With the twenty-fifth dynasty the Ethiopians are again in supremacy. Previous to this the king, Piankhi Miamun, had asserted his power over Egypt, but it was short-lived, for his son Miamun Nut's authority did not extend farther north than Thebes.* In this portion of Egyptian history we are brought face to face with two contending factions. On one side are the Ethiopians, on the other a "mixed multitude" of princes, satraps, and kings, some subordinate and some aspiring to become paramount, but with no fixed dynastic permanence. We turn to the inscription of Piankhi and learn in what light he looked upon his opponents.

The following extract follows the paragraph which informs of his final triumph:

"When the earth grew light, in the morning, very early, there came the two kings of the South and two kings of the North, with their royal serpent-diadems, to worship before the presence of his Majesty. With them also the kings of Upper Egypt and the princes of Lower Egypt, who came to behold the grace of his Majesty. Their legs were the legs of women. They did not enter the king's house, because they were unclean, and besides, they ate fish, which is an abomination to the king. But as for King Nimrod, he went into the king's house, because he was clean and ate no fish. They stood there upon their legs, every one at the entrance of the king's house."†

The point I wish to make is that the word Hyksos, whether as a term of reproach or not, must be judged from the stand-point of the enemies of the Ethiopian kings and applied as they would apply it. I turn again to the inscription of Piankhi. It will be remembered that between Nimrod, king of Hermopolis Magna, and Piankhi there was a bond of union. He alone of all the conquered princes enters the king's house. When Hermopolis Magna surrendered, Nimrod, after prostrating himself before Piankhi and making his submission, offers his peace-offerings of "silver, gold, blue and green stones, iron, and many jewels." Nimrod himself leads "forward a horse with his right

* "Egypt under the Pharaohs" (Brugsch), vol. ii. p. 248. Eng. trans.
† Ibid., p. 247.

hand; in his left was a sistrum, and the striking-plate was of gold and blue stones."* Later on, when Piankhi visits the stables of Nimrod, he speaks in the inscription as follows: "When his Majesty visited the stables and the studs of foals he observed that [they had] let them starve. He said: 'I swear as surely as the youthful sun-god Ra loves me, as surely as I breathe in life, it is a viler thing to my heart to let the horses starve than all the other faults that thou hast committed. That thou hast laid thy heart bare through this, evidence is furnished me of thy habitual views. Hast thou forgotten that the shadow of a god rests upon me? The proof thereof shall not be wanting to him on my part! Would that another had done such a thing to me, an ignorant man, not a haughty one, as he is! I was born out of my mother's womb, and created out of the egg of a divine essence. I was begotten by a god. By his name! I will not forget him in what he has commanded me to do.' Then he had his (Nimrod's) possessions assigned to the treasury, and his granaries to the property of the god Amon of Api."† The evidence that the cult of the horse belonged to the Ethiopian may be derived from a variety of sources. "According to Diodorus and Cephalion, the Trojan war took place during the reign of Teutamus, the successor of Mithras; Priam was a satrap of the Assyrian empire, and sent to Teutamus for assistance after the death of Hector." "Syncellus states that Babius, otherwise Teutamus, or Tautanes, the second, called by the Greeks Tithonus, a later king, sent his son Memnon to the assistance of Priam." "Susa was likewise denominated the Memnonian city, and its acropolis and palace were called after Memnon's name."‡ Most of these names are found in connection with the eighteenth dynasty. As the sitting statue of Amenhotep III. was the vocal Memnon of Grecian story, we may infer that Teutamus, or Tautamus, and Babius are so many variants of Thutmes and Baba, names which are found on the monuments in connection with the eighteenth dynasty. The connection of the eighteenth dynasty with the royal line of

* "Egypt under the Pharaohs" (Brugsch), vol. ii. p. 237. Eng. trans.

† Ibid., p. 238.

‡ "Historical Survey of the Astronomy of the Ancients" (Lewis); Herodotus (Rawlinson), note to c. liv., Book V.

Susiana is further suggested by its connection with the priestly dynasty, and through it with the twenty-fifth dynasty, known as the Ethiopian; the name of a king of the latter, variously written as Tarcus, Tirhakah, Taaharaqa, Tarquu, is found on an inscribed brick at Susa in the form of Tirkhak. "This latter name is identical with that of the Ethiopian king, Tirhakah, mentioned in Scripture (II. Kings xix. 9). It may be further noticed that this title Khak, common to the Susian and Ethiopian kings, is not improbably the same term, ὅσ or ἄσ, which Josephus states, on the authority of Manetho, to signify "a king" in the sacred language of Egypt (contra Apionem, lib. i.). It can hardly be doubted also that the *χάγαν* or *Khakan* of the Turkish nations is derived from the same root." * In the same connection I may cite another note from the same work (see Colonel Rawlinson's "Notes on the Early History of Babylonia," p. 30, note 2): Astyages is Aj-dahák, "the biting snake;" Deioces is Dahák, "the biting." It may be noticed here that the name Apopi of the Sallier papyrus, which is the name of a king in the so-called shepherd dynasty, according to the copyists of Manetho, Aphobis or Apôphis, occurs in the form of Apap, "the great serpent." In keeping with the expectation, the horse takes prominence. The heads and forelegs of horses form the capitals of the pillars of the great palace at Susa. In the legend of Troy the horse plays an important part in the fortunes and destiny of that city. Taking the cult of the horse as a postulate, we can understand why the Greeks adopted the peculiar stratagem by which Troy was taken. Another instance are the sacred horses accompanying the army of Cyrus. Herodotus, describing the different nations composing the army of Xerxes, says, "The Arabians and Ethiopians who came from the region above Egypt were commanded by Arsames. . . . The Eastern Ethiopians—for two nations of this name served in the army—were marshalled with the Indians. They differed in nothing from the other Ethiopians save in their language and character of their hair, while they of Lybya are more woolly-haired than any other people in the world. The equipment was in most points like that of the Indians, but they wore upon their heads

* Herodotus (Rawlinson), App., Book I., Essay VI., note 5, p. 348.

the scalps of horses, with the ears and mane attached; the ears were made to stand upright and the mane served as a crest." * The joining the Indians with the Ethiopians recalls the place the horse held in the doctrine of metempsychosis as held by them, and, if no better reason can be given, may account for the very strong language Piankhi uses when speaking of the bad treatment Nimrod's horses had received. Circumstances of this kind may be multiplied; they are in themselves, separately considered, of no particular importance, but taken together they all have one common drift.

The second story of Josephus, in those things which it relates of Amenophis, points in a still more unmistakable manner to Piankhi. We begin with the following: "The king was desirous to become a spectator of the gods, as had Orus, one of his predecessors in that kingdon, desired the same before him."

This Josephus ridicules: "What gods, I pray, did he desire to see? Had he not already beheld the ox, the goat, the crocodile, and the baboon ordained by law to be worshipped, and how could he behold the heavenly gods, and why would he desire it?" The inscription of Piankhi throws some light upon this matter. But, before we refer to that, we would like to make a quotation from an inscription of Horemhib, the Horus of Manetho: "In the third year, under the reign of the king of Egypt, Horemhib, his Holiness showed himself comparably to the sun-god Ra, in his own sepulchre, for the purpose of making an offering of bread to his father, Amon. As he came out from the Golden Chamber, cries of joy sounded through the whole region, and the shout rose up heavenward." † Piankhi Miamun also desired "to become a spectator of the gods." His inscription relates: "Returning and on his way to the temple of the Sun, he was greeted most warmly by the overseer of the house of the god, and the leader of the prayers pronounced the formula 'of the keeping away of evil spirits from the king.' The arrangement of the house of stars was completed, the fillets were put on, he was purified with balsam and holy water, and the flowers were presented to him for the house of the obelisk

* Herodotus (Rawlinson), Book VII. 70.

† "Egypt under the Pharaohs" (Brugsch), vol. i. p. 472. Eng. trans.

(Ha-benben). He took the flowers, ascended the stairs to the great window to look upon the sun-god, Ra, in the house of the obelisk. Thus the king himself stood there. The prince was alone. He drew back the bolt and opened the doors, and beheld his father, Ra, in the exalted house of the obelisk, and the morning bark of Ra and the evening bark of Tum. The doors were (then) shut, the sealing-clay was laid on, and the king himself impressed his seal. He commanded the priests (as follows): 'I have satisfied myself of the secure closing; none other of all the kings shall enter more.' As he stood there, they threw themselves prostrate before his Majesty, while they spake thus: 'May Horus, the friend of the city of On, endure and increase and never vanish away!'" * The term Horus is continually applied to Piankhi in this inscription. The people of Hermopolis sing, "Beautiful is Horus, who abides in his city, the son of the sun Piankhi." When the prince Paf-tot-bast, of Heracleopolis Magna, makes his submission, he prostrates himself before his Majesty and cries, "Hail to thee, Horus, mighty king! Bull that wardest off the Bulls. The abyss has swallowed me up; I am sunk in darkness; give me light for my countenance."

"He (Amenophis) might see the gods if he would clear the whole country of the lepers and other impure people."

This is applied to the Jews with little or no reason to support it. The presence in Egypt of a Canaanitish people will account for the disease of leprosy being there, without making the Jews the particular sufferers from the malady. The Jews at their departure were exposed to contagion from the disease, and some of their number were its victims. The evil was great enough to cause Moses to insert in his code laws to restrain its spread among the people by the rigid exclusion of the unfortunate victims of the dreaded disease. But a gloss is put upon the words leprous and impure (unclean), as if they were synonymous,—that is, that the unclean were all lepers. Unclean or impure, as used by religious purists, is a stigma put upon things and practices which are forbidden by the sacred law. This characterization of things as clean and unclean was not uncommon among the ancients. Nations

* "Egypt under the Pharaohs" (Brugsch), vol. ii. p. 243. Eng. trans.

which have different laws as to what is clean and unclean are unclean to each other, for, according to the law, the eating of an unclean thing makes the eater unclean also. The inscription of Piankhi curiously illustrates this point: "With them also the kings of Upper Egypt and the princes of Lower Egypt, who came to behold the grace of his Majesty. . . . They did not enter the king's house, because they were unclean, and besides, they ate fish, which is an abomination to the king." If I mistake not, there is an allusion here to the death of Osiris.

It will be now seen that most of the events related in the second story of Manetho are not only characteristic of the times of Piankhi, about B.C. 738, but a series of like ones transpire. Other resemblances occur with still later history, but I turn to another story connected with the departure of the children of Israel, which places it at about this time.

It is the story of Lysimachus, which Josephus also gives. The same is repeated by Tacitus, but with a few variations.* It is much in the same vein as story number two of Manetho. I notice it because Bocchoris is made the Pharaoh of the exodus. The chief opponent of Piankhi was Tafnakhth of Sais,—this prince is called Tnephachthus by Diodorus, who also calls his son Bocchoris. According to the copyists of Manetho, Bocchoris was the sole king of the twenty-fourth dynasty. The name of this KING has been identified on the monuments as Bak-en-ran-ef. Notwithstanding this, it is not impossible that the name of Bocchoris is a corruption of two names which are given to Piankhi; the similarity between the corrupted names and that of Bak-en-ran-ef leading to the ascription to him of deeds which properly belonged to Piankhi, he thereby becoming the Pharaoh of a spurious exodus of the Jews from Egypt.

The hypothesis of the transmutation of Piankhi's names is, this king is continually addressed in the inscription as Horus, as if the appellation fitted him in some especial way. Piankhi is also written Pionkhi. Pionkhi in combination with Horus, also written Oros, becomes Pionkh-orus, and abbreviated with an interchange of P with B and K with C, we obtain Bocchorus.

The following table is made to give an exhibition of the dy-

* Tacitus, Book V. c. iii. "Against Apion" (Josephus), Book I. 34.

nasties reigning at about the time of the stories of the exodus, according to Josephus and Lysimachus, and from their study we may draw some conclusions detrimental to the present condition of Manetho's numbers. The eighteenth dynasty, for its first nine kings, is compared with the twenty-second, twenty-third, and twenty-fourth dynasties.

Twenty-second Dynasty.				Eighteenth Dynasty.			
Africanus.		Eusebius.		Josephus.		Africanus.	Eusebius.
1. Sesonchis	21	Sesonchusis	21				
2. Osorthon	15	Osorthos	15				
3. Three 4. Unnamed 5. Kings	25	Omitted.		1. Tethmosis	25.4	Amos 0	Amosis 25
6. Tacelôthis	13	Tacellothis	13	2. Chebron	13	Chebros 13	Chebron 13
				3. Amenophis	20.7 (42.4)	Amenôphthis 24	Amophis 21
7. Three 8. Unnamed 9. Kings	42	Omitted.					
				4. Amesses	21.9	Amersis 22	Omitted.
Twenty-third Dynasty.							
1. Petouhates	40	Petuhastis	25 (34)	5. Misaphris	12.9 (33.7)	Misaphris 13	Miphris 12
				6. Misphragmuthosis 25.10 or 20.10		Misphragmathosis 26	Misphragmuthosis 26
2. Osorcho	8	Osorthon	9				
3. Psammus	10	Psammus	10	7. Tethmosis	9.8	Tuthmosis 9	Tuthmosis 9
4. Zet (34 or)	31			8. Amenophis	30.10	Amenôphis 31	Amenôphis 31
Twenty-fourth Dynasty.	(37)	Omitted.					
1. Bocchoris	6			9. Orus	36.5	Horus 37	Orus 37

The coincidences of figures between the twenty-second, twenty-third, and twenty-fourth dynasties and the eighteenth, considered in connection with the subject we have just been discussing, is worthy of attention. When Africanus and Eusebius differ in the twenty-second dynasty, the omissions of Eusebius find corresponding omissions in the eighteenth dynasty. Eusebius omits the unnamed kings 3, 4, and 5 in the twenty-second, and Africanus, while placing them, omits twenty-five years in the eighteenth, setting down his first king, Amos, without any years, while Eusebius and Josephus give him

twenty-five. In the twenty-second next follows Tacelôthis with thirteen years; corresponding to him we have Chebron or Chebros with thirteen in the eighteenth. Following Tacelôthis are three more unnamed kings, reigning forty-two years; corresponding to these in the eighteenth, according to Josephus, are Amenophis and Amesses, reigning in all forty-two years and four months. Eusebius omits these three (7, 8, 9) in the twenty-second, and Amesses in the eighteenth, and gives Amenophis (eighteenth) twenty-one years, or one-half of the years Africanus gives to kings 7, 8, 9 in the twenty-second dynasty. The other small differences between Josephus, Africanus, and Eusebius are accounted for by the irregular way in which the excess or deficiency, caused by the omission or counting in of the portions of years, was corrected.

Misphragmuthosis, the sixth king of the eighteenth dynasty, is put down as reigning twenty-five years and ten months, or twenty years and ten months; the latter figures are those of Theophilus. Theophilus makes Misaphris and Misphragmuthosis reign in all thirty-three years and seven months, which closely corresponds with the thirty-four years Petoubates and Osorcho reign in the twenty-third dynasty, according to Eusebius. The other resemblances are so marked that they need no comment. The table brings Bocchoris on a line with Horus. The connection between Piankhi and Horus in the inscription I have so often quoted is so close that were its facts handed down by tradition their separate identity as rulers might be destroyed.

It is not proposed to decide between the eighteenth dynasty and the twenty-second, twenty-third, and twenty-fourth dynasties as to which belong the regnal years which are in dispute. Some monumental or contemporaneous authority is necessary to decide any questions of this kind. My aim has been to account for the two stories of Manetho by showing how all the principal incidents which compose them may be found scattered through a period of seven centuries. Partisan hate has had a great deal to do with their formation, and tradition has wrought much confusion with its inherent uncertainty. Tradition is like variegated marble. Dissimilar forms and colors enter into its composition, from what distant places brought we may not discover; but we know that it is a beautiful stone that will take a

very fine polish. Concerning the exodus of the children of Israel as a fact, there can be no doubt. Manetho acknowledges this in his efforts to put it in its historic place. The failure of the moderns to find any express mention of that event upon the monuments is perhaps traceable to the fact that it is too remote to escape destruction, provided it was of a nature the Egyptians would care to preserve in the same manner as they strove to keep green the glorious memories of the achievements of their great kings.

CHAPTER XX.

THE CHRONOLOGY OF COINS.

The chronological value of ancient coins has long been recognized. A coin of Antoninus Pius illustrates this. One of his sixth year has "the remarkable word AION, *the age* or *period*, and an ibis with a glory of rays round its head, meant for the bird phœnix."* The reign of Antoninus, following the technicality of the canon, began in B.C. 137, with the 1st of Thoth concurrent with July 17 (adjustment produced by statement of Timocharis). His sixth year began in B.C. 142, and was still current when Sirius rose on the 15th of July, and day of full moon, concurrent with the fifth intercalary day, B.C. 143; or, regarding the sixth year as denoting completed years, the date of the coin being the current seventh year, which began the next day, on the 1st of Thoth (July 16). This subject has already been discussed in the chapter on the Sothic cycle. I have at hand no means by which to test the accuracy of the copies of the coins of the Ptolemies which Dr. Sharpe furnishes in his "History of Egypt." In all important details I presume they are correct. Nevertheless, the circumstances which I shall endeavor to trace are in no way dependent upon them, but serve only as a means of interpretation. The representations upon these coins are natural, symbolical, and enigmatical. The an-

* "History of Egypt" (Samuel Sharpe), xv. (32).

cients were disposed to present certain subjects in disguise. This is particularly true of the measurement of time. On the coins of the Ptolemies are found as symbols of the year the palm-branch and the circle. The palm-branch and the circle belong to the hieroglyph of the vague year. The circles represent both years and cycles of years. Cycles, or periods of years, were also represented by the cornucopia. In the computations of years Greek letters are used as numerals, both in the ordinary way and in an enigmatical manner. By means of the canon of Ptolemy and the years of eras and the symbols on the coins the epochs of the coins can in some cases be fixed, and by this means are determined the meanings of certain groups of letters which, by analogy, are presumed to denote years. A comparison of the coins to be examined indicates some rules governing the numerical value of these letters. The rule followed seems to have been that when there were four or a less number of letters they had the order of (4) thousands, (3) hundreds, (2) tens, (1) units. The letters chosen to occupy these places are taken from the different orders, and they always keep a unit denomination, and their decimal value is determined by their places. For example, the letters *NI* denote respectively 50 and 10, their unit denominations are 5 and 1, and, read from right to left, they denote 15. There seems to have been a preference for these numbers to be of the same order, and one not lower than 10,—that is, for 10 to denote 1. This was, perhaps, sometimes subject to a purpose to represent in one combination several things. For example, *ΛΓΠΑ* may denote years 33, and the unit mark, *ΠΑ* (Paphos, Cyprus), where it was coined; *ΠΑ* may also denote 81 years of an era, and the whole 3381, the years of another era. Generally the letters on the right and base of the coin are read from right to left, and those on the left and top from left to right; but this is not always followed; sometimes another direction is indicated by the symbolism of the coin.

COINS OF PHILOPATOR AND ARSINOË.

I have claimed that the Egyptians, in B.C. 237, began a luni-solar cycle of thirty-three years, which received an intercalary year of twelve lunar months at the end of the cycle. The cycle was to take the place of the lunar cycle of twenty-five years,

adapted to the vague year, that year at this time losing that character and becoming one like the Julian. The Egyptians, in preferring thirty-three years for the term of the cycle, were possibly moved that way because this number of years equalled exactly three cycles of eleven years. This implies that a cycle of eleven years was also made to begin in B.C. 237. The series of cycles of eleven years described in connection with the rise of Sirius, in the reign of Takelath II., are reckoned from B.C. 1318, when Sirius rose on the 16th of July, and day of full moon. A cycle of this series began in B.C. 240. This cycle was adapted to the vague year, and denoted the advance of the lunar dates one day. The cycle of eleven years required by the Canopic year, and the luni-solar cycle of thirty-three years is one adapted to the solar year as distinguished from the vague year. The number of years is not changed, but the signification,—that

is, that as they, with the vague year, denoted the advance of the lunar dates one day, they now, with the solar year, show their falling back one day. Dr. Sharpe gives a copy of a coin of Arsinoë, the consort of Philopator. The obverse bears the portrait of Arsinoë, partly encircling which are thirty-three circles or beads, and on the neck of Arsinoë is a necklace which shows sixteen of these beads or circles. The reverse, among other symbols, bears the letters *NI*, which, read from right to left, denote singly 10 and 50, and, according to the rule laid down for the reading of these, they represent the number 15. The coin is of a date of the fifteenth year of Philopator, and in that portion of it which fell in B.C. 207. The reverse also bears a cornucopia which holds four circles or beads, which are separated from a large one by an obeliscal figure. Outside of the cornucopia is the moon's crescent, and beneath it are eight small cir-

cles, and above the cornucopia and over the larger circle is a star. This represents the rise of Sirius. The hieroglyphics indicating the rise of Sirius contain the two figures, the obelisk and the star. The Egyptians, by the decree of Canopus, proposed to keep the rising of Sirius to the 1st of Payni, and it appears they observed the event especially either upon the day of the full moon, or the new moon next following that date. In B.C. 207, in the fifteenth year of Philopator (reckoned from 1st of Thoth = October 11, B.C. 208), began the first year of the cycle of eleven years of the series of B.C. 1318. The coin of Philopator, evidently of the same year, bears upon the reverse a monogram containing the letters *PYE*. These letters, read from right to left following the rule given, denote five hundred and forty-one years. The fifteenth year of Philopator was the five hundred and forty-first year of the era of Nabonassar, reckoned from B.C.

747. The recognition of the year of this era in connection with the fifteenth year of Philopator establishes, in effect, the epoch of the era to be B.C. 747. In the chapter on the subject of the decree of Canopus, I advanced the hypothesis that it was enforced for forty-two years, but qualified it with the opinion that it might have been for a less time. My purpose then was to show that if the decree was ever enforced, the effect of it was afterwards nullified by the reinstatement of the vague year. With this coin before us we may, perhaps, come nearer the truth. If the decree was enforced for nineteen years, counting from the 1st of Payni, the day of the rising of Sirius, then in B.C. 219, a Metonic cycle being completed, the 1st of Payni will have the same lunar dates as in B.C. 238; and as Sirius will rise on the 1st of Payni, it will also be on the day of the full moon. Nineteen years contain also a luni-sidereal cycle,—that is, a cycle reckoned

by sidereal months. In nineteen years there are two hundred and fifty-four sidereal months and two hundred and thirty-five lunar months, and after this period the relations between the sun, moon, and star are, to all intents, the same. In a system like the Egyptian, when the advance of the sidereal year, the tropical year, and the return of the lunar dates were made the means by which the lapse of time was calculated from a comparison of recorded dates of these phenomena upon the monuments, the effect of reproducing upon the 1st of Payni, B.C. 219, the same solar, sidereal, and lunar phenomena as characterized that date in B.C. 238, is to destroy the chronological value of the interval between the two years. Supposing the extra intercalary day was stopped at this time, five of them having been added, and from now on the reckoning was by vague years, the dates of astronomical phenomena will be as if the Egyptian years of B.C. 219, 218, 217, etc., were the same as *vague years* of B.C. 238, 237, 236, etc. Reckoning downward from an early era, when, for example, the star rose on the 1st of Thoth and day of full moon, B.C. 1318, and following the Sothic cycle as described in this book, the third great season of the *Annus Magnus* will fall on the 1st of Payni ten hundred and eighty years afterwards, B.C. 238, and if the fourth of Philopator, which had for its epoch B.C. 219, is practically at the beginning of the third season, it is made to appear to have the epoch of B.C. 238; and as the fourth of Philopator was the five hundred and eleventh year of the era of Nabonassar (reckoning from B.C. 728), B.C. 238 obtains that number in respect to B.C. 747, because the vague year of B.C. 238 was the five hundred and eleventh, reckoned from B.C. 747. In all this I am looking at the effect of dates of the astronomical phenomena in determining epochs. My hypothesis was that the era of Nabonassar was raised nineteen years, from B.C. 728 to B.C. 747, by increasing the years of the era before the reign of Darius Nothus nineteen years, and now we can discover how the Egyptian's dates could be conformed to it without disturbing the reigns of Philippic era. We may further suppose this advance of the Egyptian dates of five days to remain when the vague *year*, at this time, was reinstated, these days not being subtracted until about B.C. 197, when the vague *dates* were restored.

The Rosetta stone mentions the 30th of Mesori as the date of Epiphanes's birthday. The language is: "And since the thirtieth of Mesori, when the king's birthday is celebrated, as also the seventeenth of Mechir, when he received the crown from his father, (the Priests) have recognized them as eponymous in the temples." From this we learn that the 30th of Mesori was the eve of some year of which Epiphanes became the eponym. If the five days added between B.C. 238 and B.C. 219 were subtracted at this time, the year will end with Mesori 30, the five intercalary days being omitted, and the 1st of Thoth will follow that date, and Epiphanes will be the eponym of the vague year which began in B.C. 197. But Epiphanes was the eponym of something more than this. In B.C. 197, before the subtraction of the five days, the 1st of Thoth concurred with the 13th of October, and the omission of the five intercalary days brought that date back to the 8th of October, the proper concurrence between the 1st of Thoth of the vague year and the Julian. October 8 was the day of the full moon following the autumnal equinox. In the same way the 17th of Mechir, in B.C. 197, concurred with the 28th of March, and, by the omission of the five days, the concurrence in B.C. 196 will be between March 23 and Mechir 17, which was on the day preceding the vernal equinox. Epiphanes was made eponymous on the 30th of Mesori, the eve of the full moon following the autumnal equinox, and on the 17th of Mechir, the eve of the vernal equinox. The date 30th of Mesori is the one of the two not affected by the restoration of the vague dates. The presence of the lunar date in the first instance may be accidental,—that is, not a necessary feature of the cycles to which Epiphanes became the eponym. The restoration of the vague year permitted the use of a luni-solar cycle of nineteen years simply as a period to mark the advance of the tropical points in the vague year. I have shown in a previous chapter on this subject that this was formerly done by a cycle of twenty-nine years, called the festival of the thirtieth year, which was without the lunar dates. Still, the presence of the lunar dates is a temporary improvement of the cycle, and goes in with the chronological tendencies of the age. The Egyptians show a willingness to abandon their old usages and to take up with what was to them modern im-

provements. The beauty of their old system lay in its simplicity, its adaptability to long periods of time, and its freedom from any necessity of change. The advantage of the Canopic year was its close following of the tropical year, but this, for any length of time, could only be obtained by an intricate system of intercalations. This exposed the time-measurement to errors, made either purposely or by carelessness, to which, under the old civilization, it was particularly exposed. They saw this, and abandoned the Canopic year. The presence of the lunar dates in the tropical cycle did not affect the vague year, and whenever they marked the advance of the tropical year they were useful for that purpose. By the old system there were four of these tropical cycles severally reckoned from each of the four cardinal points of the sun's course. A similar method may be followed now with cycles of nineteen years, which, in the old parlance, were known as cycles of the twentieth year. If the preceding suppositions are correct, in B.C. 207, as the visible new moon was on July 20, its concurrent date in the Egyptian year will be the 8th of Payni. This is an advance of the Julian dates three days from B.C. 219, when the 1st of Payni concurred with July 16, the Canopic year ceasing at that time. The full moon was on July 3, concurrent with the 21st of Pachons, eight days after the summer solstice. This is the date of the rising of Sirius indicated upon the coin of Arsinoë. This is learned from the symbolism of the coin. This fact also confirms the hypothesis I have advanced in reference to the reformation of the Macedonian year in B.C. 237. By the decree of Canopus the 17th of Tybi concurred with the 7th of Apellæus, and this causes a concurrence between the 1st of Dius and the 11th of Khoiakh. In the next year, B.C. 237, I have claimed the 1st of Dius was made to concur with the 9th of Khoiakh, the day of the visible new moon following the winter solstice, and this will produce a concurrence between the 1st of July and the 10th of Xanthicus. From July 1, B.C. 237, to July 1, B.C. 207, are exactly thirty Julian years, which show a falling back of the dates of the lunar year of nearly three hundred and twenty-six days. In this time the 1st of July will advance from the 10th of Xanthicus, its place in B.C. 237, into the thirty-first lunar year, and concur in part with the 12th of Dystrus, the fifth

month of the Macedonian year; and the 3d of July, the date of the full moon, will concur in part with the 14th of Dystrus, and the visible new moon will be on the 1st of Xanthicus. Turning to the explanation of the disks and the cornucopia, we have for the four to the left of the obeliscal figure four complete lunar months; the large disk beneath the star denoting the full moon of the fifth month,—that is, 14th of Dystrus; and the eight disks outside of the cornucopia are eight lunar months, which, with the four first mentioned, comprise the twelve months of the year. The circumstances which led to the chronological episode connected with the decree of Canopus were ephemeral. It is desirable that evidence should be discovered showing a recognition of the true epoch of the era of Nabonassar. The fifteenth year of Philopator was the five hundred and twenty-second year of the true era. This had been increased nineteen years to five hundred and forty-one in the manner, or some way similar to that, already described.

COIN OF PTOLEMY PHILOMETOR.

The obverse of the coin bears the portrait of Philometor partly encircled by thirty-eight small circles or beads. The reverse bears an eagle supporting a palm-branch, from which two branches have been removed, leaving a third with its leaves,

and before the eagle the words *Ptolemlion Philometros*, and behind the bird the following signs and letters: $\frac{\theta E 0 V}{o E}$. The first of the upper two signs is the Greek letter θ, and the word reads $\theta\varepsilon o\nu$. Dr. Sharpe remarks, "The portrait of the king is known from those coins which bear the name of '*King Ptolemy, the mother-loving god*' (see Fig. 257). The eagle on the other side of the coins has a palm-branch on its wing or by its side,

which may be supposed to mean that they were struck in the island of Cyprus. We have not before met with the title of '*god*' on the coins of the Ptolemies; but, as every one of them had been so named in the hieroglyphical inscriptions, it can scarcely be called new." Between the legs of the eagle are the letters *IAII*, and behind the backward leg of the bird, which is walking, is the letter *A*.

I have shown in the discussion of the coins of Arsinoë and Philopator that in B.C. 219 the dates of solar, lunar, and sidereal phenomena were the same in the Canopic year as they were in the vague year of B.C. 238. A series of luni-solar sidereal cycles reckoned from B.C. 219 will have for their epochs B.C. 219, 200, 181. The last, that of B.C. 181, has the same Julian epoch as Philometor's first year. Taking B.C. 219 as a technical epoch, two cycles of nineteen years, or a period of thirty-eight years, reckoned from the full moon following the summer solstice of that year, will be complete before the 1st of Thoth of Philometor's first year. The thirty-eight small rings on the obverse and the palm-branch on the reverse seem to have a reference to these cycles. Two branches have been removed, which may denote the first two cycles which are completed, the third cycle, represented by the branch bearing the leaves, being current. It is not necessary to suppose that a luni-solar cycle of nineteen years was observed in the ordinary way, but that the period was used instead of the old cycle of twenty-nine years to mark the advance of the tropical year in the vague, with the additional circumstances of lunar and sidereal phenomena. This agrees with the position taken by the authors of the decree of Canopus, that by keeping the rise of Sothis to the 1st of Payni the seasons would retain their places in the Canopic year, for when this year was abandoned the cycle would mark the advance of these phenomena in the vague year. The advance of the tropical point for nineteen years is four days, fourteen hours *plus*, and by the cycle the tropical years will advance alternately five and four days for five cycles, or ninety-five years, when the series will be begun over again, there being for every five cycles an advance of five days for each of three, and of four days for each of two cycles.

The letters *IAII* between the legs of the eagle may denote

138. Behind the backward leg is the letter *A*. As the eagle is walking, the symbolism conveys the idea that this letter, which means *one*, denotes that one year of Philometor is complete, and that his second year is current; further, that the second year is the one hundred and thirty-eighth year of some era. The last year of Philip Aridæus, following the canon, began in B.C. 318, and his successor, Alexander Ægus, began to reign in B.C. 317. In B.C. 316, Ægus, in his second year, was made a prisoner by Cassander, who kept him in bondage during the remainder of his life. B.C. 316 is the epoch of Cassander's first year as king of Macedon, according to Blair, who ignores Ægus entirely in his chronological table; but Blair reckons the first year of Aridæus one year lower than the canon; hence, applying Blair's idea to the canon epochs, Cassander's epoch will be B.C. 317. Ægus is given twelve years in the canon, but as the Seleucids began their era in B.C. 312, not waiting until the death of Ægus to throw off their allegiance to the house of Alexander the Great, so Philometor may have followed a reckoning for the dynasty of the Ptolemies from an era following the death of Aridæus, refusing even the color of allegiance to the usurper Ægus. Taking into account the virtual independence of the dynasties of the Ptolemies and the Seleucids, their royal pride, and the severance of every loyal bond by the death of Aridæus, would they for a single moment have subordinated themselves to the usurper? Even if they had, no state policy would influence Philometor to follow in that path, and exclude him from adopting the true era of his dynasty. The fact that Philometor was for a time under the influence of the Seleucid dynasty may encourage this view, which would be further confirmed if he had adopted the same era as the Seleucid. The one hundred and thirty-eighth year of the era of the Ptolemies, reckoned from B.C. 317, began in B.C. 180 with the second year of Philometor. The five hundred and sixty-ninth year of the era of Nabonassar, reckoned from B.C. 747, and the five hundred and fiftieth year of the era, reckoned from B.C. 728, began also on October 4, B.C. 180. The group of letters above given, which contains the word *θεον*, has an enigmatical character. By the side of the *E* of *θεον* is represented a much larger *E*, which has before it a circle denoting a year. If to the larger *E* is given

the power of *Epsilon*, with the accent beneath, it normally denotes 5000, and if the smaller *E* is made to represent the next lower order, it denotes 500. These added together will represent 5500, which without the final cipher will stand for 550. This is carrying out the rule laid down, that in these enigmatical numbers 10 denoted 1, and that the value of a letter depended upon its place,—that is, *Epsilon* may denote thousands, hundreds, tens, and units when it occupies the place of any of these orders. The reading of the number 550 is obscured by the fact that part of it forms the word *Θεον*. If it was so done purposely for disguise it was effectual, because from the reading upon the coin of Philopator the presumption is in favor of the era as reckoned from B.C. 747. The obverse of the coin of Arsinoë Philopator and of this one of the coin of Philometor appear to bear the same kind of interpretation. In the case of Arsinoë, the sixteen beads of her necklace may mean that sixteen years of the cycle of thirty-three years are completed, the seventeenth year being current in the first year of Philopator, which is the case. In the same way the thirty-eight rings or beads on the obverse of Philometor's coin may represent thirty-eight completed years from the epoch B.C. 219, the thirty-ninth year being current in B.C. 180.

COIN OF ANTIOCHUS VI.

A coin of Antiochus VI., Epiphanes or Dionysius, in the British Museum, renders assistance here. It is mentioned in the "Guide to the Select Greek and Roman Coins exhibited in Electrotype," by Barclay V. Head, Assistant Keeper of Coins, in the following words: "Antiochus VI. (Dionysius), B.C. 145–142, Rev. Dioscuri, wt. 255.1 grs." The same guide contains a fac-simile of the coin. The obverse has the portrait of Antiochus. His head is bound with a fillet, above which project six horns. What appear to be the two ends of the fillet fall below, one curling on the neck and the other curving backward from the head. From the last mentioned begins a chain similar to that of echinus moulding, which extends over, above, and around the head and ends at the ribbon which is curled upon the neck. This chain has exactly nineteen links. The first horn, counting from the back forward, passes between the second and third

links, and each of the five spaces between the six horns is occupied by a link. The reverse of the coin has the name of Antiochus, beneath which are two horsemen riding. Under the horses are the letters *ΘΞΡ*, and back of the riders the letters *ΤΡΥ*. Following the clew obtained from the coins of Arsinoë and Philometor, the obverse of this coin represents the condition of things preceding either his reign or the era by which he reckoned; in the latter case the reverse will have the year of the era in which he began to reign, and the two together will furnish another era which may be technical. I have shown upon what grounds it may be believed Philometor reckoned from an era which had for its epoch B.C. 317. Using this era for the interpretation of the obverse of the coin, the following result

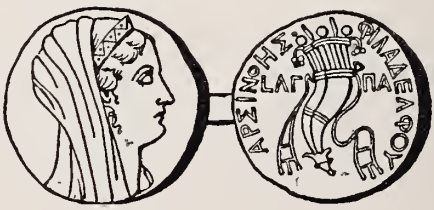
is obtained: The nineteen links of the chain denote a Metonic or cycle of nineteen years. This cycle was observed by the Greeks from the epoch of its inception, B.C. 432. The six horns of Antiochus may denote six cycles of nineteen years, or one hundred and fourteen years, and as the first horn follows the second link of the chain, this may denote that the second year of the seventh cycle is current,—that is, the epoch of the era is the one hundred and sixteenth year of the technical era of the first Metonic cycle, B.C. 432. In B.C. 317 began the one hundred and sixteenth year of the era of B.C. 432, the four hundred and thirty-second year of the era of Nabonassar, reckoned from B.C. 747, and the four hundred and thirteenth year of that era, reckoned from B.C. 728. On the reverse the Greek letters, *ΤΡΥ*, back of the riders, are symbolized as being left behind, and these, read from right to left, denote 400, 100, and 300. These, with-

out the ciphers, denote 413. We have just shown that in B.C. 317 began the four hundred and thirteenth year of the era of Nabonassar, reckoned from B.C. 728. The Greek letters beneath the horses, *ΘΞΡ*, read from right to left, denote 100, 60, and 9. According to Hales, Antiochus began to reign in the one hundred and sixty-ninth year of the Seleucid era. Taking B.C. 317, and the four hundred and thirteenth year of the era of Nabonassar, as explained above, for the epoch of the Seleucid era, the one hundred and sixty-ninth year of that era will have for its epoch B.C. 149. Hales reckons the one hundred and sixty-ninth year from B.C. 312, and places Antiochus's first year in B.C. 144. B.C. 312 is the usual epoch for the Seleucid era, but there is sufficient elasticity in the Seleucid chronology, judging by the variety of epochs which chronologers give to individual reigns, to allow for a correction of five years in that era. A luni-solar year, known as the Syro-Macedonian year, has generally been supposed to be the year adapted to the Seleucid era. This kind of year is found upon the coin, but it belongs to the Greek year. The Syro-Macedonian year began at the autumnal equinox, but as the first Book of Maccabees places an expedition into Judea in the one hundred and forty-ninth year of the era of the Seleucids, and the second Book of Maccabees places the same in the one hundred and fiftieth year of the era, an opinion has prevailed that there were two reckonings of the beginning of the Syro-Macedonian year, one commencing it at the autumnal equinox and the other at the vernal equinox. This is the view of Dean Prideaux, and he places the expedition as taking place near the autumnal equinox. The first six months of the one hundred and fiftieth year of one reckoning will overlap the last six months of the one hundred and forty-ninth year of the other reckoning, and the event falling within the overlapping of the years will belong to both. But if the chronological year of the Seleucid era was the vague year, as it appears from this coin to have been, it was reckoned from the 1st of Thoth. Following the chronology just laid down, there is an interchange of numbers between the Julian year and the year of the Seleucid era, and the year for the beginning of the expedition. This must be kept in mind to avoid confusion. In B.C. 169 the autumnal equinox was on September 27, and the 1st of Thoth

concurred with October 1. This was the one hundred and forty-ninth year of the Seleucid era, reckoned from B.C. 317. The expedition, if made about at the time of the autumnal equinox in B.C. 168, will lie so near the beginning of the one hundred and fiftieth year that, without any real discrepancy, it may be placed in either of the two years of the era. The beginning of it in the year 149 will allow most of the principal events connected with it to fall in the year 150 of the era.

COIN OF ARSINOË PHILADELPHUS.

The reverse has the double cornucopia, one part containing two disks, separated by a division mark, and the other part one disk, separated from the others in the same way. A coin of Arsinoë in the British Museum has in each part two disks, separated from the others by division marks. The reverse of the first coin mentioned bears the following letters in a straight



line, but the first three are on the left and the last two on the right of the cornucopia, *ΛΑΓΠΑ*. Dr. Sharpe's description of it is, "Coin of Arsinoë Philadelphus, dated in year 33 of the king's reign, and with the mint-mark *ΠΑ*, for Paphos, in the island of Cyprus, where it was struck." He reads the first three letters, (*L*) Lukabantos (*ΛΓ*) 33,—that is, year 33. But an additional meaning may be put upon these letters. Reading all the letters as if there were no separation between them, we get the year 3381. If this is a year of the era of Mena, we discover the opinion in the time of Philadelphus, if not that of Manetho, who wrote his history in this reign, of the era of the first Egyptian king. A cycle of eleven years of the series of B.C. 1318 began in B.C. 284, in the first year of Philadelphus. The circumstances of his accession are peculiar. His father,

Ptolemy Lagus, resigned the kingdom into the hands of his son, giving him the preeedenee as king, while reserving for himself the subordinate offiee of satrap. His purpose was to share the power with his son as a sort of minister of state, in order to tide over the diffieulties and dangers in the way of a new ruler. Soter eelebrated the aeeession of Philadelphus with a pageantry of surpassing splendor. It was made in imitation of similar ones in aneient times. In the proeession, whieh began before daybreak and continued after sunset, were emblems and emblematieal figures of the year. Dr. Sharpe gives this part of the deseription of the proeession as follows: "An altar was earried next, eovered with golden ivy-leaves, with a garland of golden vine-leaves tied with white ribands; and this was followed by a hundred and twenty boys in searlet froeks, earrying bowls of eroeus, myrrh, and frankineense, which made the air fragrant with the seent. Then eame forty daneing satyrs erowned with golden ivy-leaves, with their naked bodies stained with gay eolors, eaeh earrying a erown of vine-leaves and gold; then two Sileni in searlet eloaks and white boots, one having the hat and wand of Mereury and the other a trumpet; and between them walked a man, six feet high, in tragie dress and mask, meant for the year, earrying a golden eornueopia. He was followed by a tall and beautiful woman, meant for the Lustrum of five years, earrying in one hand a erown and in the other a palm-branch." The date of this eelebration may be inferred from some of the eireumstanees just reeited. The eeremonies began before daybreak, and we are reminded of the inseription of Rameses II. relating the rise of Sirius on the 23d of Athyr (B.C. 999). "He raised his hand, whieh bore the ineense-vessel, upwards to the heavenly orb of light of the living god. The saerifieial gifts were splendid, they were reeeived with satisfaetion in all his . . . (?) The king (now) returned from the eapital of the land of the South. [As soon as] the sun [had risen], the journey was eommeneed." The rising of Sirius, B.C. 284, was the first in the reign of Philadelphus, the seeond (following the eyele) was in B.C. 273, the third in B.C. 262, and the fourth in B.C. 251. Taking the one in B.C. 251 as the one for the date of the eoin, we have B.C. 251 *plus* 3381 equals 3632 *minus* 3 equals B.C. 3629 for the Julian epoeh of Mena, the

first Egyptian king. The epoch of the three thousand three hundredth year of the era will be B.C. 333 (3629 — 3300 + 4); this is the epoch of the last year of the last Darius, who was conquered by Alexander the Great. The epoch of Alexander was the three thousand three hundred and first year of the era. With this, the thirty-fourth year of Philadelphus, was the eighty-first year of the era of Alexander, and the three thousand three hundred and eighty-first year of the era of Mena. The reading "year 33" is carried out, but with a different sense. Philadelphus's first year was the thirty-third year of the era of the Ptolemies, reckoned from B.C. 317. The time of the duration of the Egyptian monarchy is one which has been much discussed. Dr. Lepsius lays great stress upon the number 3555, which, he says, is derived from Manetho. This number of Egyptian years, or three thousand five hundred and fifty-three Julian years (it should be three thousand five hundred and fifty-two years and two hundred and twelve days), he ends in B.C. 340; this epoch being that of the twentieth year of Ochus, who at that time terminated the Egyptian empire, and from this he calculates the era of Mena to be B.C. 3893 (should be B.C. 3892). The difference between 3892 and 3629 is two hundred and sixty-three years. The period of three thousand five hundred and fifty-five years seems to have an artificial character, and this is what might be expected; but in this aspect it refers more to the lunar year than to the vague, and manifests no development of the technical numbers of the Egyptian system. On the other hand, 3300 has for its basis the number of days in the Egyptian month, and the period contains thirty periods of one hundred and ten years, "the perfect age" of the monuments (ten cycles of eleven years). I am of opinion that the use of numbers in a technical sense, or one different from the ordinary, may explain some of the statements of Herodotus. In Book II. 100, he says the priests read him the names of three hundred and thirty sovereigns who succeeded Menes, the last of which was Mœris. This probably means that this number stopped at about the time of Mœris. If instead of three hundred and thirty kings the number really meant was thirty-three kings, the statement being technical, like some of the numbers we have been treating, it is borne out very closely

by the table of Abydos. The fifth dynasty ended with Unas, the thirty-third king of the list of Abydos. Dr. Brugsch writes, "It is with this king that the fifth dynasty of the Manethonian list ends, in accordance with the historical canon of Turin, which after the name of Unas terminates the first section of the series of the Pharaohs, by giving the total of the years of the reigns and the number of the kings which preceded. . . . The observation is of great importance for a classification of the kings of the Egyptian canon, because it proves to us that they formed one entire group, probably belonging to the same family. These were the most famous kings of Memphis, the most ancient sovereigns of the history of the world."* The third king of the next dynasty (the sixth) was Merira Pepi, the thirty-sixth of the table of Abydos. Pepi is the most important king of this dynasty; he is possibly the Mœris of Herodotus. The first Egyptian empire on this basis had a duration of eleven hundred years, following the Herodotan reckoning of three generations to a century.

* "Egypt under the Pharaohs" (Brugsch), vol. i. pp. 94, 95. Eng. trans.

Chronological Table

ADAPTED TO THE PRECEDING EXPLANATION OF THE COINS.

	B.C.	Eras of Nabonassar, B.C.		Philippic Era, B.C. 324.	Era of Alexander the Great, B.C. 332.	Era of the Ptolemies and the Seleucids, B.C. 317.	Regnal Years from the Canon.		Cycles of Eleven Years, Epoch of Series B.C. 1318.	The concurrent dates between the 1st of Thoth and the Julian year in this column are for the vague 1st of Thoth established from the observation of Timocharis.
		747	728							
B.	285	464	445	40	48	33	Philadelphus.	1	11	1st Thoth = 30th October.
	284	465	446	41	49	34		1–2	1	B.C. 284, June 30 = Pachons 4. Celebration of the accession of Philadelphus in the thirty-third year of the era of the Ptolemies and on the day of the heliacal rising of Sirius in connection with the visible new moon following the summer solstice.
	283	466	447	42	50	35		3	2	
	282	467	448	43	51	36		4	3	
B.	281	468	449	44	52	37		5	4	
	280	469	450	45	53	38		6	5	
	279	470	451	46	54	39		7	6	
	278	471	452	47	55	40		8	7	
B.	277	472	453	48	56	41		9	8	1st Thoth = October 28.
	276	473	454	49	57	42		10	9	
	275	474	455	50	58	43		11	10	
	274	475	456	51	59	44		12	11	
B.	273	476	457	52	60	45		13	1	1st Thoth = October 27.
	272	477	458	53	61	46		14	2	
	271	478	459	54	62	47		15	3	
	270	479	460	55	63	48		16	4	
B.	269	480	461	56	64	49		17	5	1st Thoth = October 26.
	268	481	462	57	65	50		18	6	
	267	482	463	58	66	51		19	7	
	266	483	464	59	67	52		20	8	
B.	265	484	465	60	68	53		21	9	1st Thoth = October 25.
	264	485	466	61	69	54		22	10	
	263	486	467	62	70	55		23	11	
	262	487	468	63	71	56		24	1	
B.	261	488	469	64	72	57		25	2	1st Thoth = October 24.
	260	489	470	65	73	58		26	3	
	259	490	471	66	74	59		27	4	
	258	491	472	67	75	60		28	5	
B.	257	492	473	68	76	61		29	6	1st Thoth = October 23.
	256	493	474	69	77	62		30	7	
	255	494	475	70	78	63		31	8	
	254	495	476	71	79	64		32	9	
B.	253	496	477	72	80	65		33	10	1st Thoth = October 22.
	252	497	478	73	**81**	66		34	11	
	251	498	479	74	82	67		35	**1**	Date of coin of Arsinoë Philadelphus, B.C. 251. July 9 = Pachons 21, the date of the heliacal rising of Sirius in connection with the full moon following the summer solstice, and in the eighty-first year of the era of Alexander the Great.
	250	499	480	75	83	68		36	2	
B.	249	500	481	76	84	69		37	3	
	248	501	482	77	85	70		38	4	
	247	502	483	78	86	71	Euergetes.	1	5	
	246	503	484	79	87	72		2	6	
B.	245	504	485	80	88	73		3	7	1st Thoth = October 20.
	244	505	486	81	89	74		4	8	
	243	506	487	82	90	75		5	9	
	242	507	488	83	91	76		6	10	
B.	241	508	489	84	92	77		7	11	1st Thoth = October 19.
	240	509	490	85	93	78		8	1	

Chronological Table (Continued).

	B.C.	Eras of Nabonassar, B.C. 747	Eras of Nabonassar, B.C. 728	Philippic Era, B.C. 324.	Era of Alexander the Great, B.C. 332.	Era of the Ptolemies and the Seleucids, B.C. 317.	Regnal Years from the Canon.	Cycles of Eleven Years, Epoch of Series B.C. 1313.	Lunar Cycle of Thirty-three Years, Epoch B.C. 237.	Tropical Period of Nineteen Years, Epoch B.C. 219.	
	239	510	491	86	94	79	9	2			
	238	511	492	87	95	80	10	3			Rise of Sirius on 1st Payni = July 16, B.C. 238.
B.	237	512	493	88	96	81	11	4	1		1st Thoth = October 18.
	236	513	494	89	97	82	12	5	2		
	235	514	495	90	98	83	13	6	3–4		
	234	515	496	91	99	84	14	7	5		
B.	233	516	497	92	100	85	15	8	6		1st Thoth = October 17. (Canopic year, October 18.)
	232	517	498	93	101	86	16	9	7		
	231	518	499	94	102	87	17	10	8		
	230	519	500	95	103	88	18	11	9		
B.	229	520	501	96	104	89	19	1	10		1st Thoth = October 16. (Canopic year, October 18.)
	228	521	502	97	105	90	20	2	11		
	227	522	503	98	106	91	21	3	12		
	226	523	504	99	107	92	22	4	13		
B.	225	524	505	100	108	93	23	5	14		1st Thoth = October 15. (Canopic year, October 18.)
	224	525	506	101	109	94	24	6	15		
	223	526	507	102	110	95	25	7	**16**		
	222	527	508	103	111	96	1	8	17		
B.	221	528	509	104	112	97	2	9	18		Accession of Philopator in the seventeenth year of the lunar cycle of thirty-three years. 1st Thoth = October 14. (Canopic year, October 18.)
	220	529	510	105	113	98	3	10	19		
	219	530	511	106	114	99	4	11	20	1	
	218	531	512	107	115	100	5	1	21	2	
B.	217	532	513	108	116	101	6	2	22	3	1st Thoth = October 13. (October 17.)
	216	533	514	109	117	102	7	3	23	4	
	215	534	515	110	118	103	8	4	24	5	
	214	535	516	111	119	104	9	5	25	6	
B.	213	536	517	112	120	105	10	6	26	7	1st Thoth = October 12. (October 16.)
	212	537	518	113	121	106	11	7	27	8	
	211	538	519	114	122	107	12	8	28	9	
	210	539	520	115	123	108	13	9	29	10	
B.	209	540	521	116	124	109	14	10	30	11	1st Thoth = October 11. (October 15.)
	208	**541**	522	117	125	110	**15**	**11**	31	12	
	207	542	523	118	126	111	16	**1**	32	13	Date of coins of Philopator and Arsinoë, B.C. 207, July 3, concurrent with 14th Dystrus = 21st Pachons in the five hundred and forty-first year of the era of Nabonassar and the fifteenth year of Philopator.
	206	543	524	119	127	112	17	2	33	14	
B.	205	544	525	120	128	113	1	3	(34)	15	
	204	545	526	121	129	114	2	4	1	16	1st Thoth = October 10. (October 14.)
	203	546	527	122	130	115	3	5	2	**17**	
	202	547	528	123	131	116	4	6	3–4	18	
B.	201	548	529	124	132	117	5	7	5	**19**	1st Thoth = October 9. (October 13.)
	200	549	530	125	133	118	6	8	6	1	

Philopator. (19 yrs. 238 and 219 B.C.)

Epiphanes.

Chronological Table (Continued).

	B.C.	Eras of Nabonassar, B.C.		Philippic Era, B.C. 324.	Era of Alexander the Great, B.C. 332.	Era of the Ptolemies and the Seleucids, B.C. 317.	Regnal Years from the Canon.	Cycles of Eleven Years, Epoch of Series B.C. 1318.	Lunar Cycle of Thirty-three Years, Epoch B.C. 237.	Tropical Periods of Nineteen Years.			
		747	728							B.C. 219	B.C. 197	B.C. 196	
	199	550	531	126	134	119	7	9	7	2			
	198	551	532	127	135	120	8	10	8	3			
B.	197	552	533	128	136	121	9	11	9	4	1		1st Thoth = October 8.
	196	553	534	129	137	122	10	**1**		5	2	1	
	195	554	535	130	138	123	11	2		6	3	2	
	194	555	536	131	139	124	12	3		7	4	3	
B.	193	556	537	132	140	125	13	4		8	5	4	1st Thoth = October 7.
	192	557	538	133	141	126	14	5		9	6	5	
	191	558	539	134	142	127	15	6		10	7	6	
	190	559	540	135	143	128	16	7		11	8	7	
B.	189	560	541	136	144	129	17	8		12	9	8	1st Thoth = October 6.
	188	561	542	137	145	130	18	9		13	10	9	
	187	562	543	138	146	131	19	10		14	11	10	
	186	563	544	139	147	132	20	11		15	12	11	
B.	185	564	545	140	148	133	21	1		16	13	12	1st Thoth = October 5.
	184	565	546	141	149	134	22	2		17	14	13	
	183	566	547	142	150	135	23	3		18	15	14	
	182	567	548	143	151	136	24	4		**19**	16	15	
B.	181	568	549	144	152	137	1	5		1	17	16	1st Thoth = October 4
	180	569	**550**	145	153	**138**	**2**	6		**2**	18	17	Date of coin of Philo-
	179	570	551	146	154	139	3	**7**		3	**19**	18	metor, B.C. 180, 550th
	178	571	552	147	155	140	4	8		4	1	**19**	year of the era of Na-
							Philometor.						bonassar of B.C. 728.
B.	177	572	553	148	156	141	5	9		5	2	1	1st Thoth = October 3.

APPENDIX.

I. A METHOD TO CALCULATE THE DATES OF NEW AND FULL MOONS.

Investigations of the kind made in this work require an easy and quick method to calculate new and full moons. Often the historical data is so limited that the work must be largely hypothetical. More than one hypothesis may suggest itself, and these must be tested with facility. The method is accurate enough to encourage or discourage, as the case may be, a more scientific calculation. More than this,—with other sufficient facts confirming it, no other calculation is necessary to determine with reasonable certainty the dates of new and full moons.

The following cycle of seventy-six Julian years is constructed for synodical months of twenty-nine days, forty-four minutes, and three seconds, nearly. It is a modification of the cycle of Callippus. It commences with the new moon on the 1st of January, 0 hours, 0 minutes, 0 seconds,—that is, at the beginning of the first day of the civil year.

The times placed opposite the years of the cycle denote the age of the month of January at the time of new moon. In this it differs from the ordinary Metonic, which gives the age of the moon. When the new moon is on the 1st of January, 0 hours, 0 minutes, 0 seconds, it will return again after twenty-nine days, twelve hours, forty-four minutes, and three seconds, which will be on the 30th of January.

Table of Cycle of Seventy-six Years.

Years.	Age of January.	Years.	Age of January.	Years.	Age of January.	Years.	Age of January.
	D. H. M. S.		D. H. M. S.		D. H. M. S.		D. H. M. S.
1	0 0 0 0	20	0 16 31 11	39	0 9 2 22	58	0 1 33 33
2	18 21 32 27	21	18 14 3 48	40	19 6 35 29	59	18 23 6 10
3	8 6 21 11	22	7 22 52 22	41	7 15 23 33	60	8 7 54 44
4	27 3 53 48	23	26 20 24 59	42	26 12 56 10	61	26 5 27 21
5	15 12 42 22	24	16 5 13 33	43	15 21 44 44	62	15 14 15 55
6	4 21 30 56	25	4 14 2 7	44	5 6 33 18	63	4 23 4 29
7	23 19 3 33	26	23 11 34 44	45	23 4 6 55	64	23 20 37 6
8	13 3 52 7	27	12 20 23 18	46	12 12 54 29	65	12 5 25 40
9	1 12 40 41	28	2 5 11 52	47	1 21 43 3	66	1 14 14 14
10	20 10 13 20	29	20 2 44 31	48	20 19 15 42	67	20 11 46 53
11	9 19 1 54	30	9 11 33 5	49	9 4 4 16	68	9 20 35 27
12	28 16 34 31	31	28 9 5 42	50	28 1 36 53	69	27 18 8 4
13	17 1 23 5	32	17 17 54 16	51	17 10 25 27	70	17 2 56 38
14	6 10 11 39	33	6 2 44 50	52	6 19 14 1	71	6 11 45 12
15	25 7 44 16	34	25 0 15 27	53	24 16 46 38	72	25 9 17 49
16	14 16 32 50	35	14 9 4 1	54	14 1 35 12	73	13 18 6 23
17	3 1 21 34	36	3 17 52 35	55	3 10 23 46	74	3 2 54 57
18	21 22 54 1	37	21 15 25 12	56	22 7 56 23	75	22 0 27 34
19	11 7 42 35	38	11 0 13 46	57	10 16 44 57	76	11 9 16 8

CORRECTIONS AND EPOCH.

At the end of seventy-six years, the lunar period being shorter by about five hours, fifty-five minutes, and sixteen seconds than the Julian, the next or following cycle of seventy-six years will have new moon five hours, fifty-five minutes, and sixteen seconds before its beginning, and each succeeding cycle will have new moon for January in each year five hours, fifty-five minutes, and sixteen seconds earlier than the previous one.

The following table of corrections shows these excesses of the Julian year for the given number of cycles:

Table of Corrections.

Cycles.				D. H. M. S.		
1	76	Julian years	*minus*	5 55 16	=	940 months.
2	152	"	"	11 50 32	=	1,880 "
3	228	"	"	17 45 48	=	2,820 "
4	304	"	"	23 41 4	=	3,760 "
5	380	"	"	1 5 36 20	=	4,700 "
6	456	"	"	1 11 31 36	=	5,640 "
8	608	"	"	1 23 22 8	=	7,520 "
12	912	"	"	2 23 3 12	=	11,280 "
24	1824	"	"	5 22 6 24	=	22,560 "
48	3648	"	"	11 20 12 48	=	45,120 "

The epoch of the first cycle is estimated to be B.C. 2924, with a correction of six hours, the new moon being taken to be six

hours before the 1st of January in that year. This will be an additional general correction of six hours, which must always be added to the other corrections.

TABLE OF MONTHS.

The table is for the common year of three hundred and sixty-five days. For leap-years the amounts in the table must be increased one day for all months after February 29. They all have *minus* signs except March, which has a *plus* sign. These denote that the amounts with which they are connected are to be subtracted, if *minus*, or added, if *plus*, to the time of new moon in January to give the new moons of the months to which they belong. In the case of March, which has a *plus* sign, this in leap-years becomes *minus* twenty-two hours, thirty-one minutes, and fifty-four seconds, which is the expression for + one hour, twenty-eight minutes, and six seconds — twenty-four hours.

Full moon is obtained by subtracting fourteen days, eighteen hours, twenty-two minutes, and one second from the time of new moon. When the time of new moon is less than the time to be taken from it, it must be increased one lunation.

Table of Months.

		Days.	Hours.	Minutes.	Seconds.
February,	—	1	11	15	57
March,	+	0	1	28	6
April,	—	1	9	47	51
May,	—	1	21	3	48
June,	—	3	8	19	45
July,	—	3	19	35	42
August,	—	5	6	51	39
September,	—	6	18	7	36
October,	—	7	5	23	33
November,	—	8	16	39	30
December,	—	9	3	55	27

LEAP-YEARS.

Every year B.C. which is divisible by four with one for a remainder, is a leap-year, and every year A.D. which when divided by four leaves no remainder, is of the same character.

GREGORIAN YEARS.

To obtain from the Julian Gregorian dates:

Between A.D. 1582, October 4, and A.D. 1700, March 1, add 10 days.
" " 1700, March 1, " " 1800, " " 11 "
" " 1800, " " " 1900, " " 12 "

ENGLISH YEARS.

Up to the reformation of the English year it began on the 25th of Mareh. By an enaetment of the British Parliament the year 1751, whieh should have eome to an end with Mareh 24, was made to cease with December 31, this year being deprived of eighty-three days. This circumstance gave rise to a double denomination of the time from the 1st of January to March 24, inclusive: the dates for this period are sometimes written with the year in the form, $\frac{1751}{1752}$. At this time eleven days were struck out of the Julian year.

For the English year:

Between A.D. 1752, September 2, and A.D. 1800, March 1, add 11 days.

From A.D. 1800, March 1, the year is the same as the Gregorian.

DIFFERENCES OF TIME.

The epoeh B.C. 2924 is adapted to the local time of Philadelphia, U.S.A. To find differences of times for other plaees, the following table may be employed for the localities mentioned:

	Hours.	Minutes.	Seconds.
Greenwich	5	0	43
Rome	5	50	43
Athens	6	35	43
Alexandria, Egypt . .	6	56	43
Thebes, " . .	7	12	43
Jerusalem	7	21	43
Babylon	7	58	3

These must be added to time at Philadelphia to obtain corresponding loeal time for the given place.

APPLICATION.

To show the use of this cycle, five new moons connected with eclipses are calculated.

1. B.C. 903, July 3, solar eclipse, which has been identified with that found on the Assyrian monument of Assurnazirpal.

2. B.C. 885, July 13, eclipse of the sun. This eclipse is separated from the former by a saros. It has been identified with that of Shamas Phul.

3. B.C. 603, May 18, eclipse of the sun.

4. B.C. 585, May 28, eclipse of the sun. This eclipse is identified by Mr. Airy, the astronomer royal, and others to be the one predicted by Thales.

5. A.D. 1836, May 15, solar eclipse. Mean time of new moon, common reckoning, May 15, nine hours, four minutes, and twenty-seven seconds. The eclipse commenced seven hours and six minutes, morning, and ended nine hours and thirty-seven minutes, morning, lasting two hours and thirty-one minutes. The time is for Philadelphia.

1. Find for the given year the year of the cycle corresponding to it, and the amount of corrections which are to be deducted from the age of the month of January for that year.

If the time is B.C., take one year from the number of the year for which the calculation is to be made, and subtract the remainder from the epoch B.C. 2924. If the time is A.D., add the number of the year taken to the year of the epoch. Next obtain from the table of corrections the largest number of Julian years there found which can be taken from the result of the first process, and set opposite it the correction in the table designated. Subtract the years, and if the result is still greater than seventy-six, take from it the largest possible number of Julian years in the table with its correction. Continue this process until the remainder is less than seventy-six years, when it will denote the year of the cycle. Next add up all the corrections, including the general correction of six hours, and subtract the sum from the amount found in the table of seventy-six years opposite the year of the cycle already obtained. The result will give the time of new moon for January of the required year.

For new moon of the other months of this year subtract or add, as designated by the table of months, the amount set opposite the required month. Notice whether the year is a leap-year or not, and follow the rules given in these cases. If the amount to be subtracted is greater than the minuend, increase the latter by twenty-nine days, twelve hours, forty-four minutes, and three seconds, and then make the reduction. The times in the table of seventy-six years are all reckoned from midnight. As the age of the month is given, to find the common date the days must be increased one, and the hours, if more than twelve, must have twelve taken from them. For example, if the final result is January five days, twenty hours, and ten minutes, this means the 6th of January, eight hours and ten minutes P.M.

1. New moon of the eclipse of B.C. 903, July 3:

		D.	H.	M.	S.	
Epoch B.C.	2924 —	0	6	0	0	
	902					
	2022					
	1824 —	5	22	6	21	
	198					
	152 —	0	11	50	32	
Year of cycle	46	6	15	56	53	
		D.	H.	M.	S.	
	46 =	12	12	54	29	
Deduct corrections		6	15	56	53	
		5	20	57	36	
Add difference of time, about 8 hours		0	8	0	0	
		6	4	57	36	January new moon for Central Asia.
Subtract time for July new moon		3	19	35	42	
		2	9	21	54	
		(+1)				
		3	9	21	54	

The result is: new moon on July 3, nine hours, twenty-one minutes, and fifty-four seconds, B.C. 903, in the morning.

2. New moon of the eclipse of B.C. 885, July 13:

		D.	H.	M.	S.	
Epoch B.C.	2924 —	0	6	0	0	
	884					
	2040					
	1824 —	5	22	6	21	
	216					
	152 —	0	11	50	32	
Year of cycle	64	6	15	56	53	
		D	H.	M.	S.	
	64 =	23	20	37	6	
Corrections		6	15	56	53	
		17	4	40	13	January new moon, Philaphia.
		D.	H.	M.	S.	
		17	4	40	13	
		0	8	0	0	
		17	12	40	13	New moon for Central Asia.
		4	19	35	42	
		12	17	4	31	New moon, July.
		(+ 1)(−12)				
		13	5	4	31	

New moon July 13, five hours, four minutes, and thirty-one seconds in the afternoon.

3. Eclipse of the sun B.C. 603, May 18:

		D.	H.	M.	S.
Epoch B.C.	2924 —	0	6	0	0
	602				
	2322				
	1824 —	5	22	6	24
	498				
	456 —	1	11	31	36
Year of cycle	42	7	15	38	0

		D.	H.	M.	S.	
	42 =	26	12	56	10	
Corrections		7	15	38	0	
		18	21	18	10	
Difference of time		0	8	0	0	
		19	5	18	10	New moon, Central Asia, for January.
Time for May		1	21	3	48	
		17	8	14	22	
	(+ 1)					
		18	8	14	22	New moon for May.

New moon on the 18th of May, eight hours, fourteen minutes, and twenty-two seconds in the morning.

4. Eclipse of B.C. 585, May 28:

		D.	H.	M.	S.	
Epoch B.C.	2924 —	0	6	0	0	
	584					
	2340					
	1824 —	5	22	6	24	
	516					
	456 —	1	11	31	36	
Year of cycle	60	7	15	38	0	
		D.	H.	M.	S.	
	60 =	8	7	54	44	
Corrections		7	15	38	0	
		0	16	16	44	
Difference of time		0	8	0	0	
		1	0	16	44	New moon, January, Central Asia.
		29	12	44	3	
		30	13	0	47	
		2	21	3	48	
		27	15	56	59	
	(+ 1)(−12)					
		28	3	56	59	

New moon on the 28th of May, three hours, fifty-six minutes, and fifty-nine seconds in the afternoon, B.C. 585.

The eclipse of B.C. 603 and that of B.C. 585 are separated by a saros. The saros is the time for the return of the same eclipse, which will fall as to its date ten days, seven hours, and forty-two minutes later in the month than the previous one if there are five intercalary days in the Julian year during the period, and eleven days *plus* if there are only four intercalary days.

	Days.	Hours.	Minutes.	
Eclipse of B.C. 585 was	27	15	56	+
" " 603 "	17	8	14	+
	10	7	42	+

The same difference will be found to exist between the eclipses of B.C. 903 and B.C. 885.

I have not at hand the calculation of the eclipse of B.C. 585 made by Mr. Airy, but it is gathered from his criticism upon Oltmanns's calculation for the eclipse of Thales that whatever difference there is, it is limited by the circumstance that Mr. Airy places the eclipse of B.C. 603 in the morning and that of B.C. 585 in the afternoon, which is the same result reached by the calculation just made. The following is from the "Monthly Notices of the Royal Astronomical Society," vol. xviii., February 12, 1858: "I think it not at all impossible that the eclipse was so predicted; and there is one easy way, and only one, of predicting it,—namely, by the saros, or period of eighteen years, ten days, and eight hours, nearly. By the use of this period an evening eclipse may be predicted from a morning eclipse; but a morning eclipse can be rarely predicted from an evening eclipse (as the interval of eight hours after an evening eclipse will generally throw the eclipse at the end of the saros into the hours of the night). The evening eclipse, therefore, of B.C. 584, May 28, which I adopted as being most certainly the eclipse of Thales, might be predicted from the morning eclipse of B.C. 602, May 17; and a man of astronomical and geometrical knowledge might, from the circumstances of one, form a shrewd guess on the circumstances of the other, provided the hours of day were such as to make both eclipses visible. Now, the hours were

such as to make both eclipses visible; and, moreover, the eclipse of B.C. 602 was a large eclipse in Asia Minor and the Levant. It is, therefore, very probable that the eclipse of B.C. 584 was predicted as it is asserted. No other of the eclipses discussed by Baily or Oltmanns presents the same facility for prediction." The years and dates of the quotation from Mr. Airy are those used by astronomers. B.C. 1, according to chronologers, is reckoned as B.C. 0 by astronomers, and the latter mean by B.C. 602 and B.C. 584 the years in common understanding, B.C. 603 and B.C. 585. The astronomers also reckon the days from noon, and the time seventeenth day in the morning means the eighteenth day, that by the civil reckoning beginning at midnight. The circumstances cited by Mr. Airy are applicable to the eclipses of B.C. 903 and B.C. 885; they have the same relation to each other, that of B.C. 903 being in the morning and that of B.C. 885 in the afternoon. The results obtained by the crude method I have explained are quite satisfactory. I conclude with a calculation of a new moon of comparatively recent date, and the result happens in this case to be very near the truth.

5. A.D. 1836, May 15, eclipse of the sun at Philadelphia. Mean time of new moon, common reckoning, was May 15, nine hours, four minutes, and twenty-seven seconds. The eclipse commenced in the morning seven hours and six minutes and ended nine hours and thirty-seven minutes, lasting two hours and thirty-one minutes.

		D.	H.	M.	S.
Epoch B.C.	2924 —	0	6	0	0
	1836				
	4760				
	3648 —	11	20	12	48
	1112				
	912 —	2	23	3	12
	200				
	152 —	0	11	50	32
Year of cycle	48	15	13	6	32

	D.	H.	M.	S.	
48 =	20	19	15	42	
Corrections	15	13	6	32	
	5	6	9	10	New moon, January, Philadelphia, Julian year.
Add 12 days for Gregorian year	12				
	17	6	9	10	New moon, January, Gregorian year.
Time for May. Leap-year . .	2	21	3	48	
	14	9	5	22	New moon, May.
	(+1)				
	15	9	5	22	

	H.	M.	S.
New moon, May 15,	9	5	22
Correct time for mean new moon, May 15,	9	4	27
Difference,			55

From the foregoing calculations it will be seen that the method employed is sufficiently correct for many purposes.

II. TABLES FOR DETERMINING CORRESPONDING DATES BETWEEN THE JULIAN AND THE EGYPTIAN VAGUE YEAR.

The adjustment between the two is made upon a statement of an ancient astronomer, Timocharis. He has left on record an observation of the place of Venus on the 17th of Mechir, in the thirteenth year of Philadelphus, which year, by the canon, began in B.C. 273; but the month Mechir fell in B.C. 272. By a modern calculation this has been found to correspond to October 8, B.C. 272.

Table I. gives the Egyptian dates corresponding to the 1st of March for the bissextile years. The horizontal column at the top contains the hundreds for each bissextile, and the two perpendicular colums headed B.C. and A.D. contain the remaining numbers of these years. The other columns have the Egyptian dates concurring with March 1. Tables II. and III. are respectively tables of days of the Egyptian vague year and the common Julian year of three hundred and sixty-five days.

Table I.

DATES OF MARCH 1 IN THE EGYPTIAN YEAR.

B.C.	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	A.D.	0	100	200	300	400
97	20	(25)	30	5	10	15	20	30	5	10	15	20	25	30	5	10	15	20	25	30	5	10	20	25	4	15	10	5	25	
93	Mechir.	26	1	6	11	16	21	1	6	11	16	21	26	1	6	11	16	21	26	1	6	11	21	26	8	16	11	6	26	1
89	21	27	2	7	12	17	22	2	7	12	17	22	27	2	7	12	17	22	27	2	7	12	22	27	9	17	12	7	27	2
85	22	28	3	8	13	18	23	3	8	13	18	23	28	3	8	13	18	23	28	3	8	13	23	28	10	18	13	8	28	3
81	23	29	4	9	14	19	24	4	9	14	19	24	29	4	9	14	19	24	29	4	9	14	24	29	11	19	14	9	29	4
77	24	30	5	10	15	20	25	5	10	15	20	25	30	5	10	15	20	25	30	5	10	15	25	30	12	20	15	10	30	5
73	25	1	6	11	16	21	26	6	11	16	21	26	1	6	11	16	21	26	1	6	11	16	26	1	13	21	16	11	1	6
69	Mechir.	2	7	12	17	22	27	7	12	17	22	27	2	7	12	17	22	27	2	7	12	17	27	2	14	22	17	12	2	7
65	26	3	8	13	18	23	28	8	13	18	23	28	3	8	13	18	23	28	3	8	13	18	28	3	15	23	18	13	3	8
61	27	4	9	14	19	24	29	9	14	19	24	29	4	9	14	19	24	29	4	9	14	19	29	4	16	24	19	14	4	9
57	28	5	10	15	20	25	30	10	15	20	25	30	5	10	15	20	25	30	5	10	15	20	30	5	17	25	20	15	5	10
53	29	6	11	16	21	26	1	11	16	21	26	1	6	11	16	21	26	1	6	11	16	21	1	6	18	26	21	16	6	11
49	30	7	12	17	22	27	2	12	17	22	27	2	7	12	17	22	27	2	7	12	17	22	2	7	19	27	22	17	7	12
45	Phamenoth.	8	13	18	23	28	3	13	18	23	28	3	8	13	18	23	28	3	8	13	18	23	3	8	20	28	23	18	8	13
41	1	9	14	19	24	29	4	14	19	24	29	4	9	14	19	24	29	4	9	14	19	24	4	9	21	29	24	19	9	14
37	2	10	(15)	20	25	30	5	15	20	25	30	5	10	15	20	25	30	5	10	15	20	25	5	10	22	30	25	20	10	15
33	3	11	(16)	21	26	1	6	16	21	26	1	6	11	16	21	26	1	6	11	16	21	26	6	11	23	1	26	21	11	16
29	4	12	(17)	22	27	2	7	17	22	27	2	7	12	17	22	27	2	7	12	17	22	27	7	12	24	2	27	22	12	17
25	5	13	(18)	23	28	3	8	18	23	28	3	8	13	18	23	28	3	8	13	18	23	28	8	13	25	3	28	23	13	18
21	6	14	(19)	24	29	4	9	19	24	29	4	9	14	19	24	29	4	9	14	19	24	29	9	14	26	4	29	24	14	19
17	7	15	(20)	25	30	5	10	20	25	30	5	10	15	20	25	30	5	10	15	20	25	30	10	15	27	5	30	25	15	20
13	8	16	(21)	26	1	6	11	21	26	1	6	11	16	21	26	1	6	11	16	21	26	1	11	16	28	6	1	26	16	21
9	9	17	(22)	27	2	7	12	22	27	2	7	12	17	22	27	2	7	12	17	22	27	2	12	17	29	7	2	27	17	22
5	10	18	(23)	28	3	8	13	23	28	3	8	13	18	23	28	3	8	13	18	23	28	3	13	18	30	8	3	28	18	23
1	11	19	(24)	29	4	9	14	24	29	4	9	14	19	24	29	4	9	14	19	24	29	4	14	19	31	9	4	29	19	24
	Mechir.	Tybi.	Tybi.	Khoiakh.	Athyr.	Phaophi.	Thoth.	Tybi.	Mesori.	Epiphi.	Payni.	Pachons.	Pharmuthi.	Pharmuthi.	Phamenoth.	Mechir.	Tybi.	Khoiakh.	Athyr.	Athyr.	Phaophi.	Thoth.	Mesori.	Epiphi.	Payni.	Pachons.	Pharmuthi.	Epiphi.	Payni.	Payni.	Epiphi.
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	A.D.	0	100	200	300	400

Table II.

TABLE OF DAYS OF EGYPTIAN YEAR.

Dates.	Thoth.	Phaophi.	Athyr.	Choiakh.	Tybi.	Mechir.	Phamenoth.	Pharmuthi.	Pachons.	Payni.	Epiphi.	Mesori.
1. . .	1	31	61	91	121	151	181	211	241	271	301	331
2. . .	2	32	62	92	122	152	182	212	242	272	302	332
3. . .	3	33	63	93	123	153	183	213	243	273	303	333
4. . .	4	34	64	94	124	154	184	214	244	274	304	334
5. . .	5	35	65	95	125	155	185	215	245	275	305	335
6. . .	6	36	66	96	126	156	186	216	246	276	306	336
7. . .	7	37	67	97	127	157	187	217	247	277	307	337
8. . .	8	38	68	98	128	158	188	218	248	278	308	338
9. . .	9	39	69	99	129	159	189	219	249	279	309	339
10. . .	10	40	70	100	130	160	190	220	250	280	310	340
11. . .	11	41	71	101	131	161	191	221	251	281	311	341
12. . .	12	42	72	102	132	162	192	222	252	282	312	342
13. . .	13	43	73	103	133	163	193	223	253	283	313	343
14. . .	14	44	74	104	134	164	194	224	254	284	314	344
15. . .	15	45	75	105	135	165	195	225	255	285	315	345
16. . .	16	46	76	106	136	166	196	226	256	286	316	346
17. . .	17	47	77	107	137	167	197	227	257	287	317	347
18. . .	18	48	78	108	138	168	198	228	258	288	318	348
19. . .	19	49	79	109	139	169	199	229	259	289	319	349
20. . .	20	50	80	110	140	170	200	230	260	290	320	350
21. . .	21	51	81	111	141	171	201	231	261	291	321	351
22. . .	22	52	82	112	142	172	202	232	262	292	322	352
23. . .	23	53	83	113	143	173	203	233	263	293	323	353
24. . .	24	54	84	114	144	174	204	234	264	294	324	354
25. . .	25	55	85	115	145	175	205	235	265	295	325	355
26. . .	26	56	86	116	146	176	206	236	266	296	326	356
27. . .	27	57	87	117	147	177	207	237	267	297	327	357
28. . .	28	58	88	118	148	178	208	238	268	298	328	358
29. . .	29	59	89	119	149	179	209	239	269	299	329	359
30. . .	30	60	90	120	150	180	210	240	270	300	330	360
1												361
2												362
3 } Intercalary days.												363
4												364
5												365

Table III.

TABLE OF DAYS OF THE COMMON YEAR, THREE HUNDRED AND SIXTY-FIVE DAYS.

Dates.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1 . . .	1	32	60	91	121	152	182	213	244	274	305	335
2 . . .	2	33	61	92	122	153	183	214	245	275	306	336
3 . . .	3	34	62	93	123	154	184	215	246	276	307	337
4 . . .	4	35	63	94	124	155	185	216	247	277	308	338
5 . .	5	36	64	95	125	156	186	217	248	278	309	339
6 . . .	6	37	65	96	126	157	187	218	249	279	310	340
7 . . .	7	38	66	97	127	158	188	219	250	280	311	341
8 . . .	8	39	67	98	128	159	189	220	251	281	312	342
9 . . .	9	40	68	99	129	160	190	221	252	282	313	343
10 . . .	10	41	69	100	130	161	191	222	253	283	314	344
11 . . .	11	42	70	101	131	162	192	223	254	284	315	345
12 . . .	12	43	71	102	132	163	193	224	255	285	316	346
13 . . .	13	44	72	103	133	164	194	225	256	286	317	347
14 . . .	14	45	73	104	134	165	195	226	257	287	318	348
15 . . .	15	46	74	105	135	166	196	227	258	288	319	349
16 . . .	16	47	75	106	136	167	197	228	259	289	320	350
17 . . .	17	48	76	107	137	168	198	229	260	290	321	351
18 . . .	18	49	77	108	138	169	199	230	261	291	322	352
19 . . .	19	50	78	109	139	170	200	231	262	292	323	353
20 . . .	20	51	79	110	140	171	201	232	263	293	324	354
21 . . .	21	52	80	111	141	172	202	233	264	294	325	355
22 . . .	22	53	81	112	142	173	203	234	265	295	326	356
23 . . .	23	54	82	113	143	174	204	235	266	296	327	357
24 . . .	24	55	83	114	144	175	205	236	267	297	328	358
25 . . .	25	56	84	115	145	176	206	237	268	298	329	359
26 . . .	26	57	85	116	146	177	207	238	269	299	330	360
27 . . .	27	58	86	117	147	178	208	239	270	300	331	361
28 . . .	28	59	87	118	148	179	209	240	271	301	332	362
29 . . .	29	. .	88	119	149	180	210	241	272	302	333	363
30 . . .	30	. .	89	120	150	181	211	242	273	303	334	364
31 . . .	31	. .	90	. .	151	. .	212	243	. .	304	. .	365

RULES GOVERNING THE USE OF THE TABLE.

1. Find the concurrent date of the 1st of March in the given year. For example, let the given year be B.C. 747. Run down the column 700 of Table I. until opposite B.C. 49; this denotes the year 749, which is the bissextile year previous to B.C. 747. The concurrences established in this year (749) after March 1 will continue down to March 1, B.C. 745, the next bissextile year. The finger stops in column 700 opposite B.C. 49, where is found Thoth 7 for the concurrent date of March 1 in B.C. 747.

2. The concurrences for all the other dates are calculated from March 1 and its corresponding Egyptian date, using the two tables of days. March 1 is the 60th day of the year in the table of days for all dates following it in the bissextile year, and for all the dates of the three following years. March 1 is the 61st day of the year for all dates before it in the bissextile year.

APPLICATION.

The 7th of Thoth has been found to concur with the 1st of March in B.C. 749. To find the concurrent date of the 1st of Thoth in this year, take the difference between the 1st of Thoth and the 7th of Thoth, which is 6 days, and subtract it from 61, because B.C. 749 is a bissextile year; the result gives 55, which in the table of days denotes February 24. To find the concurrence for B.C. 747, the same number of days is to be subtracted from 60, because B.C. 747 is not a leap-year; the result, 54, denotes February 23 as the concurrent date. To find the concurrent date for the 12th of Pachons in 749, 748, 747, 746, find from Table II. the number for 12th of Pachons, which is 252, then find how many days this is after the 7th of Thoth by subtracting from it 7 days, and add the result, 245 days, to 60 (March 1), and we obtain the 305th day of the Julian year, which in the table of days is found to be November 1, the concurrent date for 12th of Pachons. To find the concurrence of November 1 the process is reversed: 60 is subtracted from 305, and the remainder, 245, is added to 7, giving 252, the 12th of Pachons. In the foregoing the 7th of Thoth is also the seventh day of the

year; the calculations are made from the numbers of the dates in the tables of days.

Table I. has for the years from B.C. 237 to B.C. 197, inclusive, the concurrences in brackets. This is done to conform to the hypothesis advanced, that during this period the Egyptian year was substantially like the Julian, and consequently there was no advance of the dates of the latter in the former, and that at the end of this period the vague dates were restored by increasing the dates of the Egyptian year ten days; hence B.C. 196 has a concurrence with the Julian the same as if no change had been made in the Egyptian year between B.C. 237 and B.C. 197.

In discussing the coins of the Ptolemies this view was qualified by the hypothesis that the decree of Canopus was only enforced down to B.C. 219, at which time five days had been added to the Egyptian year, and from this time on down to B.C. 197 the vague year was in force, but with the concurrence produced by the addition of five days in the Canopic year, and in B.C. 197 the proper vague dates were restored by subtracting the five intercalary days.

With this view the concurrent dates for 1st of March will be:

B.C.	237,	March 1	=	Tybi 14	(15).
"	233,	"	=	" "	(16).
"	229,	"	=	" "	(17).
"	225,	"	=	" "	(18).
"	221,	"	=	" "	(19).
"	217,	"	=	" 15	(20).
"	213,	"	=	" 16	(21).
"	209,	"	=	" 17	(22).
"	205,	"	=	" 18	(23).
"	201,	"	=	" 19	(24).
"	197,	"	=	" 20	(25).
"	196,	"	=	" 25.	

The adjustment between the Julian and the vague year in vogue causes the 1st of Thoth, B.C. 747, to concur with February 26. This is the condition which comes about twelve years earlier by the tables. If the common or usual correspondence is desired, increase the given year by twelve, and find for the year so obtained.

III. HOW TO FIND THE DAY OF THE WEEK FOR ANY DATE.

B.C.	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	28	27	26	25	24	23	22	21	20	19	18	17
A.D.	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	8	9	10	11	12
				B.				B.				B.				B.				B.				B.				B.
January	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6
February	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2
March	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3
April	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6
May	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1
June	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2	4
July	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6
August	3	4	5	7	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2
September	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5
October	1	2	3	5	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7
November	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5	6	7	1	3
December	6	7	1	3	4	5	6	1	2	3	4	6	7	1	2	4	5	6	7	2	3	4	5	7	1	2	3	5

EXPLANATION OF TABLE.

The numbers of the years in horizontal columns B.C. and A.D. are those of a cycle of the sun. They are to each other in reverse order because the years B.C. are counted in reverse order to those A.D. The numbers in the columns perpendicular to the columns first mentioned are those of the days of the week which begin the months they are set opposite.

The days of the week are represented as follows: 1 = Sunday, 2 = Monday, 3 = Tuesday, 4 = Wednesday, 5 = Thursday, 6 = Friday, 7 = Saturday.

To find the day of the week for any date B.C. or A.D.:

1. Divide the number of the year B.C. or A.D., if it is more than 28, by that number, and the remainder, if any, will give the year of the cycle. If there is no remainder the last year of the cycle is the year required. The year of the cycle obtained, if B.C., will be found in the upper of the two horizontal columns; if A.D., in the lower of the two.

2. Having found the year of the cycle, then find the day which begins the given month. Its number will be found in the column under the year of the cycle already obtained and opposite the required month in the table.

3. If a date other than the first of the month is to be found, take *one* from the number of the day beginning the month, as previously found, and add to the remainder the number of the

given date, and divide the result, when possible, by 7; the remainder will be the number of the day of the week for the date. If there is no remainder, 7 is the number.

For Gregorian dates:

Between October 4, A.D. 1582, and A.D. 1700, March 1, subtract 3 days.
" March 1, " 1700, " " 1800, " " 4 "
" " " 1800, " " 1900, " " 5 "

For English year, between September 2, A.D. 1752, and A.D. 1800, Mareh 1, subtraet 4 days. From B.C. 1800 the English year is the same as the Gregorian.

APPLICATION.

Required the day of the week for February 26, B.C. 747: $747 \div 28 = 26$, quotient, and 19 remainder. Year B.C. 747 is the 19th year of the solar eyele. Under year 19 of the eolumn B.C., and opposite the month of February, is found 7, consequently February begins with Saturday in B.C. 747. $7 - 1 = 6 + 26 = 32 \div 7 =$ quotient 4, with 4 for remainder. This remainder denotes the fourth day of the week, whieh is Wednesday. In B.C. 747 the 26th of February was on Wednesday.

Required the day of the week for February 23, B.C. 728: $728 \div 28 = 26$, no remainder; therefore year 28 of the cyele eorresponds to B.C. 728. Under 28, upper column (B.C.) and opposite February, is 3. Tuesday begins February in B.C. 728. $3 - 1 = 2 + 23 = 25 \div 7 = 3$, quotient, and 4 remainder. February 23, B.C. 728, was on Wednesday.

Required the day of the week for the 25th of December, A.D. 1890: $1890 \div 28 = 67$, quotient, 14 remainder. Under 14, column A.D., and opposite Deeember, is found 7. From this subtraet 5 days for the Gregorian year, and we get 2, Monday. December begins on Monday. $2 - 1 = 1 + 25 = 26 \div 7 = 3$, quotient, 5 remainder, whieh denotes Thursday. December 25, A.D. 1890, is on Thursday.

Note.—When the number to be subtraeted is greater than that from which it is to be taken, increase the latter seven days, or one week, and then proeeed. In the previous example, if the Gregorian correetion of 5 days had not been subtracted from

the 7, but left for the last operation, the final result would be the same, and the foregoing note will apply.

$7 - 1 = 6 + 25 = 31 \div 7 = 4$, quotient, 3 remainder, $3 + 7 = 10 - 5 = 5$, Thursday.

IV. ADVANCE OF THE SIDEREAL YEAR IN THE VAGUE YEAR.

Years.	Days.	Hours.	Minutes.	Seconds.
1	. .	6	9	9
2	. .	12	18	19
3	. .	18	27	28
4	1	0	36	37
5	1	6	45	47
6	1	12	54	56
7	1	19	4	5
8	2	1	13	15
9	2	7	22	24
10	2	13	31	33
20	5	3	3	7
30	7	16	34	40
40	10	6	6	14
80	20	12	12	28
120	30	18	18	42
160	41	0	24	56
320	82	0	49	52
480	123	1	14	47
510	130	17	49	28
540	138	10	24	8
1460	374	6	47	29
	365			
	9	6	47	29

V. ADVANCE OF THE TROPICAL IN THE VAGUE YEAR FOR FOUR HUNDRED AND FIFTY YEARS.

Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Minutes.	Seconds.
1		5	63	15	6	125	30	6	187	45	7	249	60	7	311	75	7	48	48
2		11	64	15	12	126	30	12	188	45	12	250	60	13	312	75	13	37	36
3		17	65	15	17	127	30	18	189	45	18	251	60	19	313	75	19	26	24
4		23	66	15	23	128	31	0	190	46	0	252	61	0	314	76	1	15	12
5	1	5	67	16	5	129	31	5	191	46	6	253	61	6	315	76	7	4	0
6	1	10	68	16	11	130	31	11	192	46	12	254	61	12	316	76	13	52	48
7	1	16	69	16	17	131	31	17	193	46	17	255	61	18	317	76	18	41	36
8	1	22	70	16	22	132	31	23	194	46	23	256	62	0	318	77	0	30	24
9	2	4	71	17	4	133	32	5	195	47	5	257	62	6	319	77	6	19	12
10	2	10	72	17	10	134	32	10	196	47	11	258	62	11	320	77	12	8	0
11	2	15	73	17	16	135	32	16	197	47	17	259	62	17	321	77	18	56	48
12	2	21	74	17	22	136	32	22	198	47	23	260	62	23	322	78	23	45	36
13	3	3	75	18	4	137	33	4	199	48	4	261	63	5	323	78	5	34	24
14	3	9	76	18	9	138	33	10	200	48	10	262	63	11	324	78	11	23	12
15	3	15	77	18	15	139	33	16	201	48	16	263	63	16	325	78	17	12	0
16	3	21	78	18	21	140	33	21	202	48	22	264	63	22	326	78	23	0	48
17	4	2	79	19	3	141	34	3	203	49	4	265	64	4	327	79	4	49	36
18	4	8	80	19	9	142	34	9	204	49	9	266	64	10	328	79	10	38	24
19	4	14	81	19	14	143	34	15	205	49	15	267	64	16	329	79	16	27	12
20	4	20	82	19	20	144	34	21	206	49	21	268	64	21	330	79	22	16	0
21	5	2	83	20	2	145	35	2	207	50	3	269	65	3	331	80	4	4	48
22	5	7	84	20	8	146	35	8	208	50	8	270	65	9	332	80	10	53	36
23	5	13	85	20	14	147	35	14	209	50	14	271	65	15	333	80	15	42	24
24	5	19	86	20	19	148	35	20	210	50	20	272	65	21	334	80	21	31	12
25	6	1	87	21	1	149	36	2	211	51	2	273	66	3	335	81	3	20	0
26	6	7	88	21	7	150	36	8	212	51	8	274	66	8	336	81	9	8	48
27	6	12	89	21	13	151	36	13	213	51	14	275	66	14	337	81	15	57	36
28	6	18	90	21	19	152	36	19	214	51	20	276	66	20	338	81	20	46	24
29	7	0	91	22	1	153	37	1	215	52	1	277	67	2	339	82	2	35	12
30	7	6	92	22	6	154	37	7	216	52	7	278	67	8	340	82	8	24	0
31	7	12	93	22	12	155	37	13	217	52	13	279	67	13	341	82	14	12	48
32	7	18	94	22	18	156	37	18	218	52	19	280	67	19	342	82	20	1	36
33	7	23	95	23	0	157	38	0	219	53	1	281	68	1	343	83	1	50	24
34	8	5	96	23	6	158	38	6	220	53	6	282	68	7	344	83	7	39	12
35	8	11	97	23	11	159	38	12	221	53	12	283	68	12	345	83	13	28	0
36	8	17	98	23	17	160	38	18	222	53	18	284	68	18	346	83	19	16	48
37	8	23	99	23	23	161	38	23	223	54	0	285	69	0	347	84	1	5	36
38	9	4	100	24	5	162	39	5	224	54	6	286	69	6	348	84	7	54	24
39	9	10	101	24	11	163	39	11	225	54	12	287	69	12	349	84	12	43	12
40	9	16	102	24	16	164	39	17	226	54	17	288	69	18	350	84	18	32	0
41	9	22	103	24	22	165	39	23	227	54	23	289	70	0	351	85	0	20	48
42	10	4	104	25	4	166	40	5	228	55	5	290	70	5	352	85	6	9	36
43	10	9	105	25	10	167	40	10	229	55	11	291	70	11	353	85	12	58	24
44	10	15	106	25	16	168	40	16	230	55	17	292	70	17	354	85	17	47	12
45	10	21	107	25	22	169	40	22	231	55	22	293	70	23	355	85	23	36	0
46	11	3	108	26	3	170	41	4	232	56	4	294	71	5	356	86	5	24	48
47	11	9	109	26	9	171	41	10	233	56	10	295	71	10	357	86	11	13	36
48	11	15	110	26	15	172	41	15	234	56	16	296	71	16	358	86	16	2	24
49	11	20	111	26	21	173	41	21	235	56	22	297	71	22	359	86	22	51	12
50	12	2	112	27	3	174	42	3	236	57	3	298	72	4	360	87	4	40	0
51	12	8	113	27	8	175	42	9	237	57	9	299	72	10	361	87	10	28	48
52	12	14	114	27	14	176	42	15	238	57	15	300	72	16	362	87	16	17	36
53	12	20	115	27	20	177	42	20	239	57	21	301	72	21	363	87	22	6	24
54	13	1	116	28	2	178	43	2	240	58	3	302	73	3	364	88	4	55	12
55	13	7	117	28	8	179	43	8	241	58	9	303	73	9	365	88	9	44	0
56	13	13	118	28	13	180	43	14	242	58	14	304	73	15	366	88	15	32	48
57	13	19	119	28	19	181	43	20	243	58	20	305	73	21	367	88	21	21	36
58	14	1	120	29	1	182	44	2	244	59	2	306	74	2	368	89	3	10	24
59	14	6	121	29	7	183	44	7	245	59	8	307	74	8	369	89	9	59	12
60	14	12	122	29	13	184	44	13	246	59	14	308	74	14	370	89	14	48	0
61	14	18	123	29	19	185	44	19	247	59	19	309	74	20	371	89	20	36	48
62	15	0	124	30	0	186	45	1	248	60	1	310	75	2	372	90	2	25	36

ADVANCE OF THE TROPICAL IN THE VAGUE YEAR FOR FOUR HUNDRED AND FIFTY YEARS (CONTINUED).

Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours.	Years.	Days.	Hours	Years.	Days.	Hours.	Minutes.	Seconds.
373	90	8	386	93	11	399	96	15	412	99	19	425	102	22	438	106	2	14	24
374	90	14	387	93	17	400	96	21	413	100	0	426	103	4	439	106	8	3	12
375	90	20	388	93	23	401	97	3	414	100	6	427	103	10	440	106	13	52	0
376	91	1	389	94	5	402	97	8	415	100	12	428	103	16	441	106	19	40	48
377	91	7	390	94	11	403	97	14	416	100	18	429	103	21	442	107	1	29	36
378	91	13	391	94	17	404	97	20	417	101	0	430	104	3	443	107	7	18	24
379	91	19	392	94	22	405	98	2	418	101	5	431	104	9	444	107	13	7	12
380	92	1	393	95	4	406	98	8	419	101	11	432	104	15	445	107	18	56	0
381	92	6	394	95	10	407	98	14	420	101	17	433	104	20	446	108	0	44	48
382	92	12	395	95	16	408	98	19	421	101	23	434	105	2	447	108	6	33	36
383	92	18	396	95	22	409	99	1	422	102	5	435	105	8	448	108	12	22	24
384	93	0	397	96	3	410	99	7	423	102	11	436	105	14	449	108	18	11	12
385	93	6	398	96	9	411	99	13	424	102	16	437	105	20	450	109	0	0	0

N.B.—The last two columns contain minutes and seconds. They follow the days and hours of all the columns they are set opposite, to complete the time.

The compositor made an error in setting up this table. It should be in six columns each containing seventy five years. The columns of Minutes and Seconds are for successive periods of seventy five years.

THE END.

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